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VOL. XXI. NO. I

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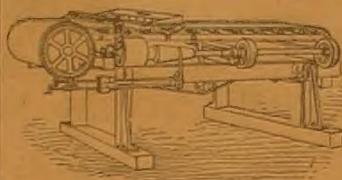
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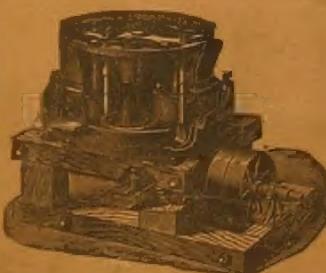
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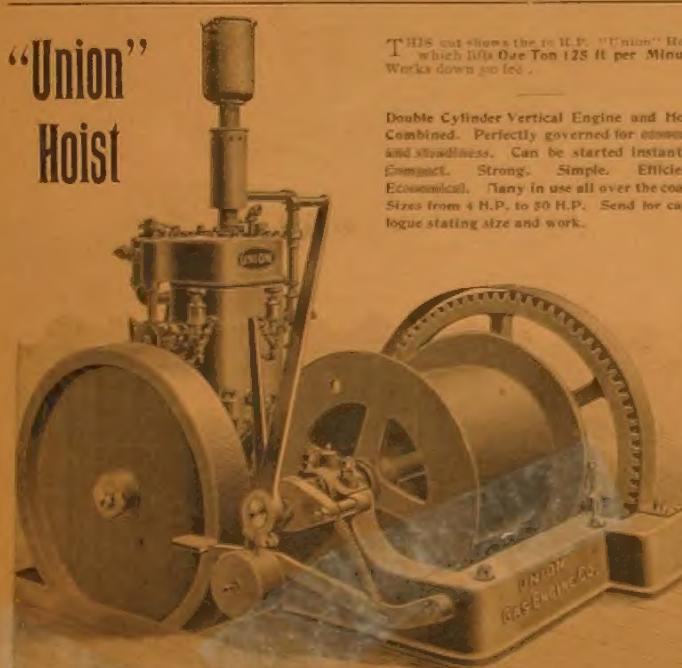
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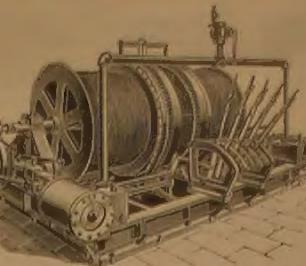


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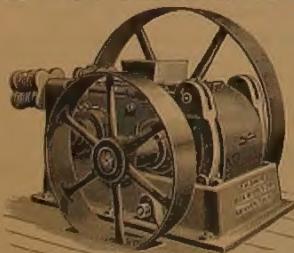
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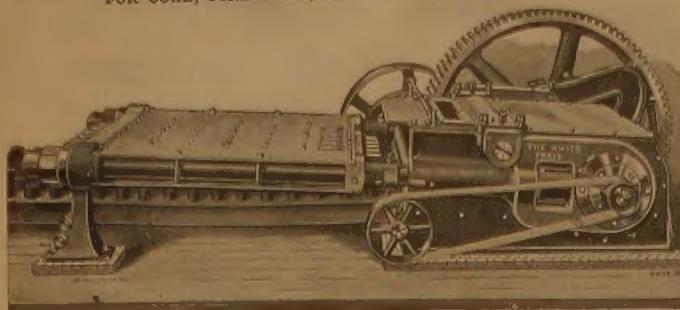
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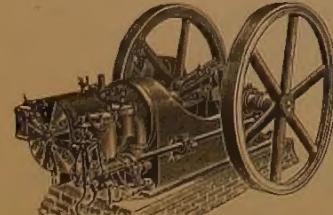
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The present prosperity and rapid extension of all branches of mining in the Southern part of the State, render the organization and union of the Mine owners, Superintendents, Assayers, Prospectors, Miners, and all others interested in mining, at the present time highly opportune.

Any measure or Association which tends to benefit the industry is indirectly a benefit to those connected with mining, hence to gain the full benefits to be derived from concerted action and union of those interested is to become a member of this trade association.

The meetings of a trade society of this kind are held for furthering the general interests of this industry and to secure Municipal, State or Federal recognition and benefits which the importance of the occupation of mining as a means of developing the natural resources of the country demands at the hands of our representatives.

The individual efforts of a mine owner or company are feeble compared with the united force of such an organization of miners, representing as it does some 14,000 employees of the State mining interests.

Among the objects which the association undertakes, are or have been: Proper representation of the mining interests by creating a Department of Mines and Mining, the secretary to be a member of the Federal Cabinet.

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The association recognizes only such matters as are of general interest to the mining industry at large and takes no side regarding strikes, rates of wages, or interest in the organization of companies, sales of mines, or regarding any locality or individual interest.

The interchange of opinions and views in regard to technical matters pertaining to mining can be presented by members in essays or papers read at the meetings of the Association and it thereby becomes a mutual benefit to its members.

It is therefore a benefit to all parties interested in mining to become members of the Southern California Branch of the State Miners' Association by attending the first meeting which is to be held in the hall of the Chamber of Commerce, corner of 4th Street and Broadway, on Saturday, the 29th April, at 8 P. M., entrance to hall on 4th Street.

THE MINERS' ASSOCIATION.

The idea of forming such an association in Southern California had its origin in the success of the California State Miners' Association of San Francisco during the past years of its existence and usefulness. From time to time the JOURNAL, along with other papers, have advocated such a course, and in instance of this published a special edition on November 1, 1896, and sent a representative of the JOURNAL to attend the November convention of that Association, and was the sole representative that Southern California has had at its meetings, before or since that time. In the following issue the full proceedings of the Convention were reported. Under the heading "County Miners' Association," it was advocated in the 1st October, 1897, issue, to form such branches in all southern counties and send delegates to the California State Miners' Association meeting, to be held on the 18th October, 1897. Again, on the 15th September, 1897, issue, the "California Miners' Association" was recommended as the proper society for the miners of the southwest to become affiliated with. On 15th October, 1897, the subject was again presented as "The State Miners' Association." In the next issue of 1st Nov., 1897, the proceedings of the sixth annual meeting were published.

In the *Mining and Scientific Press* of 12th November last a long editorial was published advocating the extension of the sphere of usefulness of the State Miners' Association, which in part says:

"As it is at present, it is a State Association only in name. There are large areas of this State in which there is not one member of the Association. Take, for instance, seven of the southern counties where a great deal of mining is going on, and where the mining interests are of importance. In each of those counties there

"should be a county miners' association."

"This missionary work is a present need."

Correspondence and interviews were made from this office with that end in view. The result arrived at, from the opinion of the most experienced mining men in this section was that on account of the widely separated position of so many of the mining camps of the several counties of Southern California, that county miners associations were not considered as workable as the organization of a Southern California Branch in Los Angeles to which all mining districts could send delegates.

On 31st December last, Mr. U. S. G. Todd of Los Angeles wrote a letter to a small local paper advocating the formation of an Association for Southern California, but the editor of that paper thinks it is not the proper time and says:

"The question and the only question to be considered here is whether the present is the best time to act on the suggestion 'originally' made by Mr. Todd of forming a 'Southern California Miners' Association.' The consensus of opinion is that it is not; and also says: 'The JOURNAL did not originate the idea, never had anything to say about it,' etc., etc.

The foregoing extracts and facts show that the origin of the formation of such an organization dates long before Mr. Todd thought of it, and before the small local sheet had any existence. The editor of this little publication of the *Times*' mining extracts feels aggrieved that any one should advocate and approve a measure he has condemned, and takes satisfaction in the school boy fashion of calling names at his superiors. Were it not for the claim made to originating the idea of forming such a branch for Southern California, no notice would have been taken of the ignorance displayed by one who claims to have arrived at the years of discretion.

In reference to the above Mr. Benjamin, secretary of the California Miners' Association, writes under date 24th March 1897:

"In order to settle the question as to who originated the proposition of establishing a branch in Southern California, it is only necessary to refer to the proceedings of our 5th annual convention, held in San Francisco, Nov. 10th and 11th, '96, on page 114, where the address of Mr. F. W. Edelsten, who was the accredited delegate for Southern California at that convention, is published in full.

I send you herewith a copy of said proceedings for reference.

It is a pity that at this time any opposition should be developed toward harmonizing all of the mining interests in South California, and I shall do my utmost to prevent such a condition arising, and I trust that personalities of all kinds will be avoided, and that a strong organization may be effected, which will foster and promote the mining industry in Southern California."

With best wishes I remain,

Yours very truly,
(Signed) EDWARD H. BENJAMIN,
Secretary.

HOISTING FROM SHAFTS.

The equipment of a prospect shaft, or at a small mine, when the shaft is vertical, or almost so, is not always of that kind that would meet the requirements of the mine regulations or approval of a mine inspector, where such are established institutions for the benefit and safety of employees. In too

many cases a loose swinging bucket is used, to hoist from shafts of from 200 to 500 feet or more in depth. As soon as a shaft has attained a depth of from 50 to 100 feet, a cross-head to carry the bucket, and guides or conductors, should be placed on each side of the shaft, to prevent swinging and striking the sides. Such slides or guides are best made of a railroad rail on each side of the shaft, and on which the crosshead slides with the least amount of friction. These conductors are still more necessary if the shaft is not at all parts perfectly vertical.

Miners in going up or down a shaft always prefer to ride on a bucket or cage, in preference to taking the ladders, especially after a shift at work, hence the need of making the bucket keep an even course and from striking the sides of the shaft. The ease with which tools and timbers can be handled when there is a crosshead, and as a preventative to accidents, makes such a provision a matter of economy in saving time in hoisting.

IN STATU QUO.

As we have expected from the beginning of the session, Congress has adjourned without touching the mining question. Therefore the question is *in statu quo*, so far as the laws are concerned, and the position of political parties remains unchanged.

Both sides are preparing for the contest at the next regular session of Congress, which commences on the first Monday of December next. The Republicans evidently feel obliged to take the initiative, for the Congressional Committee of their party has held a meeting at which a special committee was appointed to consider the action that shall be taken. The silver men are indisposed to disturb the present law, which provides for the coinage of 18,000,000 silver dollars annually, which adds to the silver circulation, and it will take a number of years to coin the bullion which the government possesses. Moreover, the opposition are not in a position to force affirmative action on their theories, as both branches of the new Congress and the executive are against them.

The Secretary of the Treasury chafes under this, as it increases embarrassment to his scheme of ultimate retirement of the silver dollars into gold redemption, and on the basis of their bullion value. He is also intent on retiring the greenbacks and treasury notes and substituting banknotes.

The President has studiously abstained from committing himself to specific measures, and has only indulged in generalities. It is probable that he will not specifically commit himself, for the money question will be sharply in issue in the next presidential campaign, and like all Presidents, he is a candidate for renomination and re-election, and like all politicians, he will seek to avoid rugged issues.

Secretary Gage on the money question is the *bete noir* of the administration. He is neither a politician nor a partisan. In 1892 he supported Cleveland, and McKinley in 1896. Mr. Gage is impressed with the idea that he has an apostolic mission, and that he is more than a John the Baptist preaching in the wilderness and living on locusts and wild honey, but that he is the one to whom John was the forerunner. He may be able to force the President to something definite, for he is earnest, and whether right or wrong such

men stubbornly wage war. He is backed by the bankers and bond syndicates. The money question will not be permitted to sleep, and Mr. McKinley will hardly have the nerve to confront the forces behind his Secretary of the Treasury.

In his generalities the President has said enough to preclude support from the silver men or those who oppose retirement of government bonds and the creation of a national bank monopoly. The opponents to Mr. Gage's schemes will be quite willing to accept the issue as he is bound to present it. To carry his measures through Congress will require Herculean efforts, and if it shall be done through pressure of power and party discipline the question will still remain with the people in the political campaign on whom such influences will not be as potent as with congressmen. To carry out his plans Mr. Gage must have affirmative legislation, which it is always more difficult to obtain than to defeat. A law for the free and unlimited coinage of silver will not be passed during the next two years, nor are the prospects bright for enacting such legislation as the Secretary of the Treasury desires. Therefore we predict that the money situation will remain *in statu quo* until after the 4th of March, 1901.

CLIMATE AND MINING.

The extremely dry climatic conditions of the past year in California have been productive of decreased output in almost all the mining districts. Since the new year, it looked as if the present year was to be of a similar dry character, but recent rain and snow in the mountains have averted such an undesirable occurrence. In all sections of the State good crops and sufficient water supply are assured during the coming summer.

A striking contrast to the above good which snow and rain have produced in California is the disastrous effect which the late heavy falls of snow have produced in the mountain sections of Colorado, with the unfortunate loss of human life. Too much of a seemingly good thing for one section of the country is a detriment and a curse in another, when the natural environment of a high altitude or northern climate does not prevent the venturesome miner from risking life, comfort and health in the pursuit of the hidden mineral wealth. It is only those who have operated mines in the extreme cold climates and also in the genial south or southwest who can appreciate the great difference which climate produces in the operation of many mines. To such an extent does climate affect mining conditions as to make a process of ore reduction or class of machinery a success in one section and an utter failure in another. When extreme climatic conditions and inexperience of the operator in mining under such difficulties make up the combination, there is something striking or disastrous going to happen.

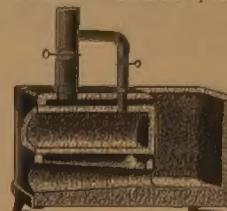
The experience of many in Alaska last winter has been on these lines, in not heeding the warnings that it is no country for the inexperienced prospector to operate in, for it is more difficult to travel, cut wood and haul it, and thaw frozen ground in the north than it is to haul water and prospect in the large undeveloped sections of the south west, where the same expenditure of energy and capital will yield equally as good results. Recent discoveries and developments at Randsburg, Searchlight, Dale City and Mesquite desert mining camps are the proof this statement.

Patent for Republic No. 2.

The Republic Number Two Gold Mining company has received the receivers' receipt, which is equivalent to the granting of a patent to the group of claims which the company owns in Republic camp. At the office of the company it was learned that the development of the Rosanza group on the opposite side of the hill from the Republic No. 2 workings is of so promising a nature as to give the Republic No. 2 stockholders encouragement.

A New Assay Furnace.

It is desirable, when compactness and economy of fuel is an important consideration, for the assayer or prospector to have his assay furnace as self-contained, portable and convenient as possible. To meet this demand, Messrs. Wm. Hoskins & Co. have put on the market combination furnaces, on the latest of which, illustrated herewith, letters patent were granted Feb. 7th, this year.



SECTIONAL VIEW HOSKINS' COMBINATION FURNACE

This furnace has the advantage of any from of combination crucible and muffle furnace heretofore suggested, inasmuch as the introduction of a cold crucible into the crucible chamber in no way interferes with work in progress in the muffle. It utilizes the surplus heat both in the muffle chamber and the crucible chamber, yet both sections of the furnace are independently and positively heated. The gases and air are so thoroughly mixed in the combustion chamber, which it will be noticed is tapered, that crucibles in the crucible chamber are uniformly heated, avoiding the tendency to crack, due to a direct application of the blast. Gold may easily be melted in the crucible chamber while cupellation or scorification is going on in the muffle.

This furnace is made in two sizes. For further particulars write the manufacturers, Messrs. Wm. Hoskins & Co., No. 81 South Clark street, Chicago, or apply to any of the dealers in assayers' and chemists' supplies.

New Corporations.

Articles of incorporation of the Eureka Mining and Water company were filed in the office of the county recorder. The incorporators are H. I. Latham and H. J. Sisty. The capital stock is \$30,000, divided into 3,000 shares.

Articles of incorporation of the Utah and Boston Copper company were also filed. The incorporators are Thomas B. Everett of Salt Lake, Utah, and Joseph Reall and Edward L. Tierney of Boston. The capital stock is \$2,500,000, shares \$10 each. Phoenix is named as the principal place of business of both companies.

Articles of incorporation of the Rio Grande Mining company were also filed with the recorder. The incorporators are John F. Clark, George B. Deming and Kenneth J. Matheson. The capital stock is \$250,000, in shares of \$1 each.—*Phoenix Republican*.



HOSKINS' COMBINATION FURNACE

BRIQUETTING.

The briquetting of coal has been carried on in the principal countries of Europe on a very large scale, for years, and the coal briquette has held a recognized position as the most superior form of fuel for both domestic and steam purposes. In this country numerous efforts have been made to establish the industry on a commercial basis, without success. The failures were due to defective machinery, a lack of proper understanding of the subject, and the high cost of the bonding materials then known.

After thorough study of the subject, and personal investigation of all the briquetting methods pursued abroad, a press has been invented, designed and patented by Mr. B. C. White, that is specially adapted to the briquetting of fine coal. In addition to the press, complete processes for briquetting American coals have been perfected.

The fine coal or dust is the purest and richest part of the coal, as it contains a higher percentage of carbon. When this dust is mixed with a suitable binder and subjected to heavy pressure, the product is superior to the lump coal. Coal briquettes being really denser than the natural lump, will burn from the outside thoroughly to the center, not decrepitating under heat and will be nearly smokeless. They will not disintegrate from weather influences. Their cleanliness for domestic purposes is an advantage, and their compactness in storing renders them valuable for steamer use.

The outreaching of this country for foreign coal trade will be greatly facilitated by briquetting as countries such as Mexico, Central and South America, have been educated up to and prefer briquette fuel.

The subject is such a broad one that it can only be touched on here. The details of the process to be used depend upon the character of the coal, the locality and the binder most cheaply available.

While, for the purpose of this article, we will confine ourselves to the briquetting of coal, such other materials can be successfully briquetted as: precious metal ores, iron ore, tunnel dust, flue dust, calcines, manganese ore, slimes, iron pyrites, iron sand, peat, lignite, coke braize, cement, saw dust, cork dust, etc.

There is no question regarding the advantages to be obtained in smelting furnace operations through briquetting. The economy resulting from the forming of fine materials, such as flue dust, calcines, concentrates, etc., into hard little briquettes of desirable form and condition for furnace use is worthy of the careful consideration of smelters, however low the intrinsic value of such material may be. The increased speed and efficiency of the furnace is at once apparent when briquettes are introduced in place of the same material in dust form.

After repeated efforts to briquette fine materials on a commercial scale on brick presses and other presses, designed for some other purpose, a machine known as the White Mineral Press was invented, designed and patented by Mr. White, in 1896.

While this machine was a step in the right direction, and produced briquettes of desirable form and size, it has been found to be too expensive in cost of production and repairs and it was also deficient in other important particulars. The pressure was insufficient for many

materials, and its operation required the constant attendance of an expert.

Since installing a number of these machines Mr. White has investigated all the foreign briquetting machines and processes with the result that he has recently brought out a perfect briquetting press, especially designed for smelter use. It is to this machine known as the White briquetting press that we wish to call your attention.

This machine is many times more powerful than any mechanical press heretofore built. Its movements are simple and direct, it will not get out of order, and the repairs and replacements are reduced to a few simple parts at small cost. The press will run regularly at a pressure of 10,000 per square inch of the briquette.

These machines can be adapted to the briquetting of any fine material, either hot or cold and with or without the addition of an artificial binder of any character, as may be best suited to the material.

The briquetting machine shown in the cut is of the six-mold pattern, there being six moulds arranged side by side (six inches from center to center), each mold having a compression plunger which enters it from within the press box, and having at the outer end a releasing plunger which resists and weighs the pressure put upon each briquette. The compression plungers are operated by a heavy pit-

and a cam track in the main gear. This moves the molds toward the right at a speed greater than that of the compression plungers, whereby the briquettes are ejected from the molds. The press box then returns quickly to its normal position and the operation is repeated. Secured to the top of the Press is a cover plate, an opening in which admits the material to the interior of the press box.

This cover plate is extended over the whole of the machine. The bottom part of the frame on which the pitman cross-head slides also form a slide for the press box. This part is extended up at the right hand end to meet the cover plate, thus enclosing all the working parts in a dust and air tight compartment.

This compartment is partly filled with oil, whereby all the working parts are lubricated continuously without attention from the operator. The crank shaft is driven by a gear wheel seven feet in diameter and of great weight to give it momentum, thus relieving the teeth from severe strain when the pressure is applied. The gear wheel is driven by a pinion and clutch pulley. A delivery belt to carry away the finished briquettes extends back under the molds, so that the briquettes have but a few inches to drop, and is so arranged that the briquettes will drop upon their flat ends. This delivery belt is driven by belt connection to a small pulley on the crank shaft.

By reference to the illustration and foregoing description it will be seen that the following results have been accomplished:

The pressure is applied through the gears and crank shaft, pitman and plungers directly to the material to be pressed these parts being the fewest possible in number and of immense strength.

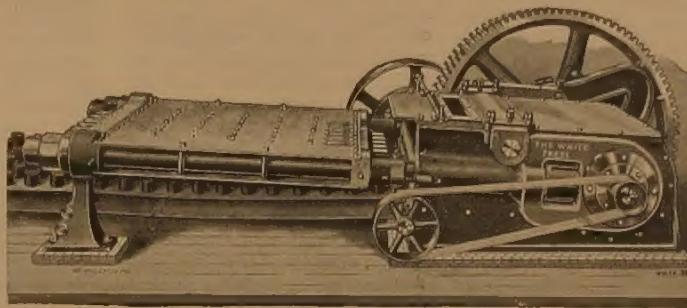
These parts are all protected absolutely from dust and grit, which advantage has not been obtained before in a mechanical press, run in a bath of oil, which insures their perfect lubrication at all times, without attention from the operator.

The number of molds is the same as the number of briquettes made at each stroke, the advantage of which is apparent when it is considered that the molds are the principal wearing parts. In all other briquetting machines there are from eight to twenty-four times as many molds as are needed in this machine, from the fact that a mold disc of some form is used which must be rotated to bring new molds into the line of pressure and to move the molds in which briquettes have been pressed out of line to eject the briquettes.

The molds move in the same direction as the plungers, instead of cross-wise, so that any wear of the compressing parts or of the parts, which move the molds will not affect the alignment and perfect action of the machine.

The press box being filled its entire width, and carrying at all times a considerable quantity of material, will give a fixed quantity at the bottom of the press box. The compression plungers passing through this mass of material will force such amount as is required into the molds, thus making a *forced feed*, which is much more reliable than a gravity feed. Tests show that the variation in weight of briquettes is very slight, showing a perfect action of the feed.

Each releasing plunger has its own pressure gauge showing exactly the pressure applied to each of the briquettes. For further information, address the Henry S. Mould Co., Carnegie Bldg., Pittsburg, Pa.



THE WHITE BRIQUETTING PRESS.

THE RECORD OF A YEAR.

The shipments of the Cœur d'Alene mines is a closely guarded secret. Even the mill owners do not know much about it aside from the properties with which they are connected until after the close of the year. Then it is customary for the smelter agents to compile the returns and furnish them to each of the shippers. These reports are as carefully looked after as \$1,000 bills, never being left around where the public may be permitted to gaze at them. It has been our good fortune, says the Wallace *Press*, to secure one of these reports for 1898, which shows the following as shipments for the year:

Name of shipper.	Tons.
Bunker Hill & Sullivan M. & C. Co.	26,400
Helena-Frisco Mining Co.	22,550
Morning Mining Co.	10,280
Con. Tiger and Poorman Mining Co.	15,350
Standard Mining Co.	13,460
Empire State Idaho Mining and Development Co. (Last Chance)	9,650
Mammoth Mining Co.	7,000
Milwaukee Mining Co. (lessees)	850
Hecla Mining Co.	300
Blake Bros. (Osburn)	100
Colwyn Mining Co.	60
Miscellaneous.	500
Total.	112,500

This is far in advance of the shipments of any previous year, although we have not the returns from previous years by which to make comparisons. This is 111,500 tons of ore and concentrates, figured on a basis of 60 per cent. lead and 35 ounces of silver per ton (certainly a conservative estimate), means an output of 270,000,000 pounds of lead and 3,937,500 ounces of silver. This product at the prices of this week would amount to a little over \$12,400,000, although the sum actually received was considerably less owing to the lower prices during most of the year. Two and a quarter million dollars of this went to the railroad and smelting companies for freight and treatment, and approximately \$2,500,000 went to the laborers who mined and milled the ore, cut and placed the timbers in the mine and performed the other work necessary to extract the ore from the mountains and prepare it for shipment. Still another million went for the purchase of new machinery, tools, powder, payments of insurance and taxes and the thousand and one incidental expenses. Even after all this there remains

a handsome surplus for the mine owners, although their modesty forbids them acquainting the public with the exact amount.

To haul it away required 5,125 freight cars carrying 20 tons each, and if placed on a side track at one time the siding would have to be 66 miles long, and if made up in trains of 10 cars each, more than can be hauled in this country, and the trains fastened together, when the front end of it reached Tekoa the last caboose would still be in sight in the yards here. Or to take it from this locality and make a wider known comparison, while the

conductor on the last caboose was still looking at the beacon on the Statue of Liberty in New York harbor the engineer on the front engine would be viewing the lights of Philadelphia.

But a glance at the figures of the different companies shows that even these enormous figures are small compared with the probable output of the coming year.

It was in the middle of the year that the Helena-Frisco cut a new lead carrying the finest ore ever found in the mine. Nothing but development work has as yet been done on this, but it is now in shape to commence making heavy shipments at any time, and as it runs largely to shipping ore the output can be greatly increased with the same milling capacity.

The Morning Mining Company lost its mill by fire last April and nothing more was done with ore until September and the mill was not running full time until October so that the output of 16,280 tons represents practically six month's work. More machinery has recently been added which increases the capacity of the mill about 20 tons daily, and the output for this year should crowd very close to 31,000 tons.

The Standard last year worked its mills less than half the time, and while it is not yet running full time it is gradually increasing and this year it should produce between 18,000 and 20,000 tons at the present rate of output.

The Empire State - Idaho made some additions to its mill late last fall, and if no more are made this year the output should run 1,000 tons or more ahead of last year.

The gem, which last year was only worked in a small way in its upper works, has now resumed operations on a considerable scale, and by the end of the year the company's books should show shipments four or five times as great as last year.

The Hecla only commenced shipping late in the year, and long before this year ends will have a mill of its own, and its shipments will

DR HARMAR, IDAHO, SHOWING DR HAMAR MINE.

amount to 2,000 tons or even a considerably larger quantity.

The Tiger, Mammoth, Bunker Hill & Sullivan will each probably show an increase of five to ten per cent., as improvements are constantly going on with them, although we know of nothing in contemplation which would make any great increase.

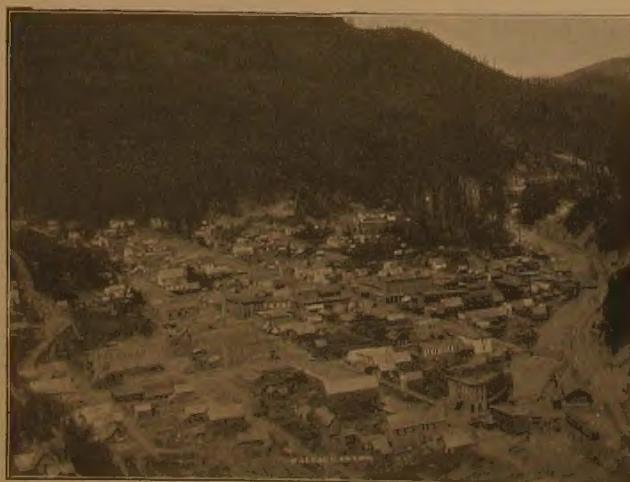
Besides, there will be a number of new shippers this year. The Black Bear which last year shipped a little from the Morning mill, will this year be working on its own account. The Hunter will be regularly shipping a car or two a day before the end of the year. The silver King will have its own mill and be turning out ore 24 hours a day. The Colwin should be a steady producer after the first of June. The Sonora, Hercules, Hummingbird, Anchor, Bell, Formosa, Pacific, Independence, Springfield, Father Lode, Chloride Queen, Blue Grouse, Sunset, Empire State, Custer Granite, Baumer, Treasure Vault, Atlantic, Red Cup, Mineral Point, Crown Point, Silver King, Lombardy, Alhambra, Lexington Klondyke, Red Cloud and numerous others are hoping to be shippers this year, and there is no doubt that several of them will be.

BLOW-PIPE ANALYSIS.

[Continued from our issue of March 15, 1899.]

Let us suppose that the beginner has procured the articles already enumerated, and has obtained a measure of proficiency in the use of the blowpipe. He has found, or there has been given him, a piece of rock which by its weight or by the appearance of minerals with metallic lustre contained in it, he suspects to be rich in valuable metals. How shall he proceed to determine whether it contains gold, silver, copper or lead, or all, or none of these elements? Also which ones, if any, are present in sufficient quantities to constitute rich ore. Where possible, a sample of ore weighing at least two pounds should be taken and cracked into fragments the size of a hickory nut. Three of these should be taken at random, and further crushed into particles the size of an apple seed. Half of this should be taken, wrapped in clean paper, labeled and laid aside. The remaining half should be wrapped in stout paper and further crushed on the steel anvil, after which it should be finely pulverized in the agate mortar, and also wrapped, labelled and laid aside.

Suppose, for example, that it is desired to test the fragment under examination for gold



WALLACE, IDAHO.



DR HARMAR, IDAHO, SHOWING DR HAMAR MINE.



GRANITE CONCENTRATOR NEAR GEM.

and silver. A piece of charcoal is slightly bored, as described before, and a small portion of the pulverized mineral is placed in the bottom of the cavity. The lamp and stand are placed in front of the operator slightly to the left. The lamp is inclined downward to the left so that the O. F. envelopes the assay, which is held below and to the left of the lamp.

The assay, after roasting, as described hereafter, should be kept in the O. F. for several minutes, when, if none but volatile metals are associated with the gold, the former will be driven off, and on examination with a magnifying glass a minute, malleable, gold-colored globule will be found at the bottom of the cavity. While being heated, the gold assumes a peculiar greenish hue, resembling melted copper. It is a good plan to add a small portion of borax and continue the flame for few minutes to remove traces of oxidizing metals and brighten the globule. A little soda may also be added, as it hastens the elimination of sulphur and arsenic, if present in small quantities.

When gold is present, but associated with reducible metals, such as silver and copper, the gold must be reduced by a process known as cupellation.

Prepare a piece of charcoal as before described, except that the cavity should be slightly deeper. Place a portion of the assay in the bottom of the cavity, together with six or seven parts of test lead, and one to two parts of powdered borax glass (in proportion to the amount of the assay). Raise the wick of the lamp so that the flame smokes slightly, and turn upon the assay a moderate R. F. As soon as the globules of lead begin to run together, the whole assay should be covered with a hot R. F. The object of the operation is to collect the gold and silver, if any be present, together with all the reducible metals, into one globule with the lead, and volatilize or slag off any others. It is readily seen that the top of the assay may be easily heated, but in order to properly heat the bottom, the assay must be turned over. This cannot be done if any lead is oxidized and dissolved in the melted body, for the latter will then stick to the charcoal. It is thus apparent that great care must be exercised, particularly in the beginning of the process, to keep the assay under R. F. After about two minutes in the reducing flame, the gold and reducible metals are collected into a

"button" with the lead, and the flame is then changed to a pointed O. F. and directed upon the button. The latter bubbles and boils actively under the flame for another two minutes, during which time all sulphur, antimony or arsenic present in the original ore is removed. The lead button is then poured out on the anvil, freed from slag, if any adheres, and is ready for cupellation.

For cupelling, a smooth cavity is bored in the charcoal a quarter of an inch in depth and five-eighths of an inch in diameter at the top, gradually decreasing towards the bottom, so as to render it cup shaped.

A small amount of bone ash is then very carefully mixed into a paste with a little water and pressed into the cavity with the broad end of the agate pestle, so as to leave the bone-ash surface slightly concave and nearly even with the coal. The bone ash is then heated slowly to redness in the O. F. to remove any trace of moisture, and the lead button is placed in the cupel so formed, the O. F. directed upon it. When the lead button has become fused, the coal cavity is brought nearly vertical, and the O. F. is directed on the bone ash just in front of the button, rather than on the button itself, so that the ash may be hot enough to absorb the fused litharge, none of which must remain on the surfaces of the cupel. By a proper direction of the flame and turning of the charcoal, the button is slowly driven about until a considerable amount of silver is shown by a play of colors due to the film of litharge. In the course of the next few seconds the lead button, previously red hot but not very lustrous, becomes bright and fixed in the cupel. This fixing should occur on a portion of the cupel on which the button has not previously rested, and the brightening is more effectual if at the last moment the button is almost touched with the tip of the R. F., to remove any trace of litharge. After it becomes bright, the button is slowly removed from the flame and examined with the magnifying glass, to detect any film of litharge, which would give the silver-white lustrous button a yellowish tinge. Gold, if presenting sufficient quantity, would give a yellowish hue to the button. This should not be confounded, however, with the yellow due to the film of oxide of lead, which latter is at once removed by treating the assay for a few seconds in the R. F. If on the contrary the color is due to gold, it will remain unchanged in the R. F.

A large button should not be cooled rapidly, as it is apt to "sprout" or throw out branch-like projections, thus losing

silver. If heated too strongly after brightening, the button loses silver by a combination with lead oxide, forming a rose colored coating on the cupel. This latter however, must not be mistaken for the bright orange red coating frequently formed by the litharge alone near the rim of the cupel. Should the button have a pure deep gold color, it may, for the purposes of this article, be considered pure gold, as 2 per cent of silver will give gold a brass yellow color, and a comparatively white globule may contain as large a percentage of gold as 40 per cent. It is therefore necessary to separate the silver from gold.

When gold is present in an amount not to exceed the proportion of one part of gold to two and one-half parts of silver, it is separated by a process known as "parting." The globule is heated with moderately strong nitric acid, and as the silver is dissolved, leaving the gold a dark residue. Even if the button, after fixing and brightening, is silver-white and lustrous, it may still contain 4 per cent of gold, and therefore all globules obtained from cupel action should be parted, and in order to be on the safe side an amount of pure silver should be added and fused with borax glass on charcoal along with the globule, varying from two and one-half times the weight of the button in cases of a brass-yellow globule to half the weight in that of a silver-white globule. In this fusion a moderate R. F. should be used and directed upon the glass until the metals are well fused and thoroughly mixed.

The resulting globule should be gently heated in a test tube with diluted (three quarter strength) nitric acid with the silver dissolved out, leaving the gold in a dark brown or black spongy mass or in separate particles.

The cessation of bubbles indicates that the silver has been dissolved and the acid should then be boiled a short time, the solution poured off and the proportion of gold present estimated from the amount left in the test tube in comparison with the whole amount tested.

After a portion of the ore under examination has been tested as described in the preceding sections for gold and silver, take in the platinum forceps a small part of the rock that has been put aside and labeled, moisten it with hydrochloric acid, and heat it in the flame. The latter should be colored a beautiful blue if copper be present.

If this reaction is not obtained, a small



MILL WORKS AND PLUMBS NEAR MURRAY, IDAHO

amount of the powder should be used to saturate a bead of microcosmic salt on platinum wire and adding chloride of sodium (salt), when the blue flame should result if copper be present in appreciable quantities.

When the presence of copper is ascertained, a small portion of the fine powder is mixed with three times its volume of soda and a little water into a stiff paste. A moderately deep cavity is then made in a piece of charcoal and the bottom covered with this paste. After two or three minutes' treatment with a strong R. F., if the substance is not readily fused the assay may be cooled and powdered and a little more soda added. On a second treatment one or more metallic buttons should have been collected, which can be separated by a knife-blade from any slag or fused soda that has not sunk into the coal.

The metallic globules so reduced are either pure copper or an alloy with other reducible metals.

Where the globule is pure copper, the surface is often darkened, but may be brightened and a copper color obtained. If rubbing fails to show the true color of copper or one of its alloys, the globule should be heated for a minute or two in the inner edge of the O. F. and, when cooled, hammered out and rubbed.

If then the true color is not obtained, but the globule is still dark, add a small portion of borax and treat it again in the O. F. to brighten and remove traces of sulphur. Too short a treatment of soda in the beginning is often a cause of failure to beginners in this test.

Although copper and most of its compounds are easily reducible by the above process, if the presence of copper is ascertained by coloration of the flame in the platinum forceps, or with microcosmic salt, but cannot be reduced to a metallic globule, the ore is probably a sulphide, arsenide, or selenide of copper and should be first roasted. To roast the powder, make a wide, shallow cavity in a piece of charcoal, and spread over it a layer of the powdered substance, pressing it down gently with the end of the agate pestle. Heat gently first with the O. F. to avoid fusing and then bring it to a low red heat, until the garlic fumes of arsenic or sulphur fumes are no longer perceptible. Then treat alternately in the O. F. and R. F. until no fumes escape. The powder will then usually form a crust, which should be carefully turned with a knife-blade and the bottom treated in the same manner.

After portions of the ore under examination have been tested for silver, gold and copper, as before described, a small portion of the powder is placed in a shallow cavity on charcoal and the lamp turned downward, so that the flame can be directed downward upon it. In the O. F. lead is volatile and in the R. F. it is also volatile and colors the flame an azure blue.

Near the assay a dark yellow lemon coat is left on the charcoal, while at a distance the coating is sulphur yellow. Lead fuses easily, and when sulphide or chloride are heated before the blowpipe on charcoal, they fuse and deposit a white coating outside of the yellow coat above described. The white coat is volatile in R. F. and tinged it blue.

Lead in metallic globules may be readily obtained from its oxides and most of its salts by the reduction tests before described. The globule is a light bluish gray in color, malleable and soft. The characteristic reactions are the coatings it gives the coal and the azure blue tinge it imparts to the R. F. Lead is easily volatilized and very fusible,

yielding a metallic globule very readily, so that care must be taken to continue the heating no longer than necessary to obtain the metal. When lead is reduced on charcoal, it may safely be said that the first globule to appear is lead, and the assay may be cooled and the globule or globules may be detached from the slag and unfused portions with the knife blade. Their weight compared to that of the assay will determine the proportion of lead in the ore.

CORRESPONDENCE

ARIZONA.

(From Our Special Correspondent.)

CHLORIDE, ARIZ., March 23d, '99.

Under the management and direction of E. T. Loy the Wallupai Mining Co. are fast getting their new concentrator at the Tennessee mine in shape for good work. The last pieces of machinery to thoroughly equip the plant for running arrived at, or soon after midnight Thursday: The lack of these equipments had greatly retarded the progress of work and development of the underground workings of the mine, and in a very few days work will begin there in great force and the number of men placed in and about the mine increased to seventy-five or more. The ore bodies in the bottom levels are immense and fully as rich in the white metal as they are big.

Charles Gross, owner of a mining claim close to the Minnesota, has been prospecting and developing it some of late and has been rewarded by the breaking into quite a large body of horn and native silver. Fragments of rich float have been found upon the location at various times and places during the past winter, but its origin had never been traced to a definite source until now the lucky prospector believes he has found the mother lode and will vigorously prospect it to a definite termination.

The gold deposit found by Joe Prisk recently, which he never could find again, can now very safely be classed with other lost mines of Arizona that were very rich in the yellow metal. About all who went out to find it immediately after its discovery and loss, have returned, and it seems about every canyon and gulch making down from Niggerhead Mountain to the valley below, has been well prospected and gone over for the lost mine, and should any return be made for its search, other sections of the mountains and Sacramento valley surrounding the place the lost mine is believed to exist in, will be gone over and given a thorough and careful search.

The old Juno mine, one of the Wallupai mining company's new acquisitions, is having its 100-foot shaft, lately begun, driven down with three shifts of men, and will soon be complete as far as the contract calls for, when a drift of indefinite length will at once begin to cut the ore body. The work is being done in excellent shape and speed.

Thos. McNeeley, at Mineral Park, is yet driving the tunnel on rich shipping ore at his mine. The rich native silver shipped from his mine in the past few months is causing unusual exertions in its development.

There is a large accumulation of ore from the late strike on the dumps of the Merrimac Mine. It is being sacked, and a large shipment and sampling lot is soon to be sent to the Grant Sampling Works, Denver. The ore body has very materially increased in size since it was broken into ten days ago,

and the quartz matter is of a fine quality and of better value than that at first obtained. The Merrimac people are very jubilant over their sudden good fortune, and it is possible that three shifts of men will be placed at work early in April—at least this is the recommendation made by Eli Hiltz, the superintendent, to his company. The ore body is certainly rich and large.

The concentrator at the Minnesota mine is not by any means keeping up with the ore output being done by two shifts of men. The bins and dumps are full of ore and the concentrator is being pushed day and night. The concentrates go out daily to the railroad at Kingman, and thence north to Pueblo and Denver. The Minnesota is a great producer of high grade ore, and the dividends are regular and large. A new shaft and drifting is to be started some distance from the old works very soon.

A few years ago Calvin Cuzinuo, keeping hotel here at the time, took a gold claim from a delinquent boarder, to square the bill. Mr. Cuzinuo has kept the assessment done since it came into his possession, but not long ago leased the claim out, and the leasees have recently struck a vein of very rich, free milling gold quartz, which is growing larger and richer with each day's work done. In fact, the ore is unusually rich in gold, and the two leasers look upon it as one of the greatest bonanzas they ever had. Mr. Cuzinuo is also very proud of having at last made something out of the bill which he held for board, and has given the discoverers a new and longer lease on the property, who will work it for all that it is worth.

William Coster is working a claim over the Divide at Mineral Park that he almost had abandoned. Thinking one day, however, that he would give it another trial. With the first shot in the face of the former drift, he broke into some chlorides that assays sixty ounces to the ton, and the last, from which no assay has yet been made, looks to be as good again or better. The camp and district at Mineral Park has been declining ever since the demonetization of silver in 1893, and the camp and mines seemed to be almost wholly abandoned. But there have been a few miners that held on and nearly every one of them has done well, and this, and because Mr. Coster was not particularly engaged, caused him to go over and do some development work, with the result as above stated.

CALIFORNIA.

SAN BERNARDINO COUNTY.

Virginia Dale District.

(From our Special Correspondent.)

March 8, 1899.

The little town of Dale is gradually building up. There are three good stores, two good restaurants, two saloons, one hotel, five quartz mills, postoffice, barber shop, Justice's office, Constable's office and assay office. Besides there are two more mills in the district—Mr. Furgason's five-stamp mill up near Burt's well, and a two-stamp mill at 29 Palms. It is evident to those who are acquainted with the vast mineral resources of this district, that Virginia Dale is the coming camp for gold mining of Southern California.

Messrs. Killian & Arbias have just finished their preliminary work on the Gold Crown group, and the boys say the claims are looking fine. It is a pity those boys have not

owned this group of claims for the past five years. The boys are hustlers and would have made a good mine out of the Gold Crown long before this.

Ellerman & St. Germene are at work on their Star mine of the Ivanhoe group, where they have lately struck a large body of high grade ore, and all the miners who have seen it say it is among the best strikes of the district.

Furguson & Co. have been making some good improvements in their White Star mill. These gentlemen have been operating with a five-stamp mill, but the mortar, as well as the stamp, was very light, and they have just replaced them with a heavier mortar and heavy stamps. In addition to these improvements they have also put in a new ore crusher. With this improved machinery and the White Star mine, we expect to see Mr. Dan Furguson go into the gold brick business (not the swindle, but genuine) on a large scale.

The O. K. mining Co. are drifting in the O. K. at the 200-foot level, and have a very fine body of ore. The O. K. is the best developed mine in the district, and shows a good body of ore in all the drifts, while at the 200-foot level the ledge is larger than at the top. It has been said by some that the ledges in this camp don't go down, but the men who say such things have never been known to follow a ledge more than ten feet to see whether or not it did go down.

Reed Brothers of the Gold Basin group, are sinking on the Gold Basin No. 2, and are taking out some very fine ore.

Mr. A. E. Sexton is working his Star King mine, and has had good ore and a large ledge ever since he first started.

There have been some very good placers recently struck near Iron Mountain and about three miles east of Gold Basin. Mr. W. C. Warren was the lucky prospector, and has lately been coming in to town with some very nice little sacks of gold dust.

Reitz & Sherman are talking of building a large entertainment hall just east of and adjoining their saloon. They are also building a large office room on the west end of their store building.

Mr. James Kinney is placering in the Humbug Mountains, and is said to be taking out \$10 per day single-handed with a small dry washer. From these reports it appears that Virginia Dale still has some placer gold.

Joe Ingersoll (the enterprising manager of the O. K. mine) returned to Dale on the stage. Joe has been in San Bernardino a fortnight looking after his many business interests in that city.

Dr. Bedford of San Bernardino, and Mr. Miller of Los Angeles, principal owners of the Leota mine, came in to Dale on the stage. The Leota is looking very fine at present. They have about 200 tons of ore on the dump that will average about \$100 per ton.

Constable E. E. Joiner has just finished his preliminary work on a new quartz location known as the Surprise.

J. J. Arbios is running his mill and cyanide plant on ore from the Jean mine. Joe has an excellent plant and has just completed a very neat assay office in one corner of his mill building.

Mr. Botsford's Los Angeles mine is looking finely, and Mr. Ames and Mr. Yager of San Bernardino, two of Mr. Botsford's partners, are now building a three-stamp mill for the purpose of working some of the ore from the Brooklyn and Los Angeles claims. The Botsford group of mines are among the most promising claims in the district. These mines

are in Virginia Dale mining district, about one and one-half miles from Gold Basin.

Messrs. Kirkpatrick, Fithoff and Carlton of Los Angeles have just arrived in camp and have gone to work developing some of the Markle claims, about one mile south of Gold Basin.

DALE MINER

MASSACHUSETTS.

BOSTON, March 21, 1899.

EDITOR JOURNAL:—Since my last letter, copper stocks have had a marked reaction, but the tone of the market is improving and the dividend paying shares have held their own better than expected. Centennial had a rise of fifteen points and a drop of nearly twenty points, and has now recovered half of this loss. Insiders say that Centennial is good for seventy-five within a short time. Arcadian has increased its capital stock from 100,000 to 150,000 shares, and the company has been reorganized under New Jersey laws. The new stock is quoted at about sixty-five. Tamarack and Calumet & Hecla have worked lower, and in my opinion are good purchases. Investors who have the patience to hold Tamarack stock for six months or a year, will see a handsome profit.

Among the outside stocks, Fortuna gold has been very active. It rose from seventy-five cents to one sixty-five per share; reacted to ninety cents and sold at one fifty. I have interviewed the president and the vice-president of the company, and I believe the company has a good property, and that the stock will sell much higher when its earning capacity is demonstrated. The management is putting in ten additional stamps, and as soon as these are in place a resumption of dividends is promised. We look for a very active general mining market in April.

ROBERT S. BICKFORD,
60 State street, Boston.

UTAH.

SALT LAKE CITY, UTAH, March 17, '99.

EDITOR JOURNAL:—While the Utah mining stock market was hardly as active this week as was the case last week. The volume of business transacted was very healthful, and quotations were generally well maintained, with some rapid and sustained advances. With the return of warmer weather and a reopening of roads in the various camps, we should have a season of greatly renewed mining activity, and a consequent broadening and hardening of the market.

Ajax was materially stronger, with every indication of a continued advance. If present plans are carried out—and they are nearly certain to prove successful—the stock will sell much higher. The mines are reported to be looking well. Alice was active, on eastern orders. There was a quiet yet persistent inquiry for Alliance, at whose properties the showing is much improved. The stock is very firmly held. Anchor did nothing of importance. Bullion-Beck paid its regular dividend of 10 cents on the 15th. The stock was stronger, with some increase in business. Continuing its advance of last week, Centennial sold at \$46.00, exdividend, but was slightly lower at the close. The properties are looking very well, indeed. Offerings of the stock were light. There was little or no change in Chloride Point, although the feeling was bearish. No information of importance is coming from the mines.

Daly was unable to maintain its advance of

last week, and sold off several points, although at the close the stock showed signs of strengthening. Its advance was entirely sympathetic. In keeping with my prediction, Daly-West continued to advance and closes strong and in demand. Offerings of the stock are comparatively limited. The working force at the mine is being increased as fast as room can be made. Dalton was active but lower, while Dalton & Lark was in strong demand at better figures, and with the heavy deals in adjoining properties now being closed, out of the way, it seems very reasonable to think that Dalton & Lark will touch much higher figures. Dexter hung very closely around last week's closing figures, but lost some of its strength at the close, although no discouraging news came from the properties, where everything is reported to be in prime condition. Some very fine shipments of cyanide product are coming from the Daisy, and the official reports are of a very flattering nature, but through the forcing out of considerable stock, the closing quotations were lower. The demand for the Security continues strong, but buyers are willing to purchase as cheaply as possible. Eagle changed but little. While fairly active, Eagle & Blue Bell sold at somewhat lower figures. Operations at the properties are being prosecuted vigorously. Four Aces was very active, at constantly changing quotations. The stock received good support. On reports that the ore grade has lowered somewhat, Geyser-Marion was slightly lower, although insiders were among the buyers. The mines are doing fairly well and dividends should be coming along within the next three months. There may be some little additional weakness shown by the stock before payments are resumed, however. Galena was not very active and quotations changed but little. The strength developed by Grand Central last week was well maintained, the demand being continuous, with offerings of stock limited. While announcing the early erection of reduction works, Golden Eagle levied an assessment of 1 cent per share. The stock weakened somewhat. Little change occurred in Horn Silver.

WASHINGTON.

SPOKANE, WASH., Mar. 20, '99.

The Insurgent Mining company, operating the Insurgent group in Republic camp, has entered into an agreement with the Lone Pine Gold Mining company whereby the Insurgent company may take the ore from its ledge out through the Lone Pine workings. This gives the Insurgent a present face of 15 feet of ore upon which work can be immediately commenced. This is at a depth of about fifty feet.

John Hanly, manager of the Insurgent, is in the city, having just come down from the property.

"We have been sinking two shafts on the Insurgent," he said. "One shaft is down 28 feet in ore, and has been from the grass roots, with the vein steadily increasing in width with depth. The second shaft, on the south part of the claim, sunk principally in wash, is 40 feet deep and in the bottom of it is a splendid showing of quartz carrying values."

"I found the Insurgent mine in better condition than I had expected. That is, the development work has been carried on not only in a practical manner, but has resulted in showings of value unusual in mines where such shallow depth has been attained. Then again the work done has proven to me that which is to my mind more valuable than the

good assays, and that is the relation of the Insurgent ledge or vein to that of the Lone Pine. When I make this statement to you I do so advisedly, that the ledges in each are identical, and that the ore body found in the Lone Pine tunnel is the same as that found in the Insurgent. I further believe, and there is every evidence to warrant it, that the Lone Pine will be and is one of the greatest mines in Republic camp, and that the Insurgent, from its standpoint of development, is its second. I carefully sampled the bottom of the workings of the Insurgent and brought with me to G. B. Dennis, president of the company, samples of ore to check against assays made by O. P. Moore, the assayer at Republic, with the following results—\$0.62, \$1.65, \$2.06, \$40.82, \$5.37, \$756.52, \$9.92. These assays certainly tell their own story, and need no embellishment from me.

BRIT.-CANADIAN INVEST. & MINING CO.

WISCONSIN.

(From Our Special Correspondent.)

WEST SUPERIOR, Wis., May 13, '99.

The recent development in the copper district which lies about twelve miles north of this city, promises some active and extensive work being done this season. The Starkweather mine has been incorporated as the Boston and Lake Superior Copper Mining Co., with headquarters and officers as follows: President, Henry Ives Turner, Boston; Secretary, Charles H. Cobb, Boston. The company has a capital of \$1,250,000, and owns the mining fee to 320 acres of land, including the Starkweather location, which was partly developed last summer. This company will begin work at once sinking on the vein and establishing the extent of the pay rock by cross cutting and trenching. The Percival Company, which owns the location on the Brule west of the Starkweather, has also secured ample backing, and already has a force at work night and day under the direction of Capt. James Maker, an experienced copper miner. B. J. Van Vleck is at the head of this company.

The North Wisconsin, located between the Percival and the Starkweather, is in the hands of F. A. Woodward, ex-mayor of Superior, and who has secured means to continue the already extensive work done on this property.

A new company is the Superior and Boston Copper Company, which owns the Fond du Lac location west of the Starkweather location and in the same formation. This company is organized locally and has sufficient capital to thoroughly test its holdings, which show on the surface very favorably. Several other locations will be worked as soon as the snow disappears to permit of surface explorations. The formation is a continuation of the Keewenowon copper bearing series of Upper Michigan and has long been looked upon with favor, though only last summer was any attempt made to develop any of the prospects. The prospects are that at least three properties will be developed and equipped at once.

KIRBY THOMAS.

Workmen on the Vaughn mine, located on the Oregon side of the Snake river, near Pine creek have recently encountered a body of rich copper ore 130 feet across, averaging 15 per cent, or nearly one-sixth pure copper. No development work of any consequence has been completed, but is being rapidly pushed.

Miscellaneous Mining News.

ARIZONA.

A new strike of copper ore has been uncovered in the Dragoons, near Turquois, by Herman Durand and William Sweeney. The two were prospecting in that section and found a rich lead of copper ore. After a little work the indications gave every appearance that an important strike has been made. The ore is rich, carrying high percentage in copper. An option has already been secured on the property.

To Examine Copper Claims.

A party consisting of Col. J. S. Cooper, Captain J. G. Keith, Dr. J. M. Ford, William Thorne and C. F. Kelly left Phoenix for the Black Buttes, eight miles west of the Vulture siding. The party will be gone four days and the time will be spent examining some copper property belonging to Dr. Ford and W. E. Thorne.

Chloride Notes.

The old Juno mine is a new acquisition for the Wallupai Mining Company, and Mr. E. T. Loy, president and superintendent for the company, is having a hundred foot shaft sunk to tap the old, and more than 200 feet from the old workings. Work has been going on for some time, and is nearly half down, and indications show that the work is being done in the right place. From the bottom of the 100-foot shaft when completed, drifts will be run both ways on the ore body.

The Merrimac mine continues to be a steady producer of shipping ore and has a good force of men on day and night shifts. Some new adits and drifts will be started soon when, it is the opinion of the management, some new bodies will be opened up.

The new concentrator at the Tennessee mine works like a charm, and all the bearings in the new machinery have worn smooth without any stoppage since fixing up. The aggregations of ore that ensued during the erection of the concentrator is fast disappearing under the new treatment, and, as in the Minnesota, the shipment of concentrates are being made daily. The drifts and tunnels below are full of ore, and two shifts of men are now at work on them.

The water supply at the Tennessee is excellent and plentiful for all uses. A Wilfley concentrator and Hartz jigs are used.

CALIFORNIA.

AMADOR COUNTY.

The Central Eureka mine at Sutter creek, which many years ago was sunk to a depth of 700 feet, was purchased by C. W. Randall about four years ago, and by him a company was organized to operate the property. A modern plant was installed and reopening and enlarging the plant was proceeded with. When it was reopened drifting on the lower level was pushed for the purpose of prospecting the property, and, after that, sinking has progressed until a depth of over 1100 feet has been attained. Last week the shaft penetrated a body of quartz which those who are familiar with the old Eureka say is a continuation of the rich ore bodies worked in that mine many years ago. The quartz contains much free gold and an abundance of sulphur

ets, and if it is abundant, and there is no reason to think otherwise, the Central Eureka will be one of the valuable properties of the Mother Lode. The reopening of the Central Eureka has been fraught with much financial difficulty, which has delayed the work much, but the recent strike will surely do away with any further delay, and a mill will be erected as soon as the new ground has been opened sufficiently for the management to determine the size of mill required.—*Amador Ledger*.

The suit of the Argonaut mining company against the Kennedy company, which was tried last fall before Judge Nicol of Tuolumne county, was decided by him in favor of the Argonaut company recently.

The promoters of the Peerless Gold Mine Development company are rapidly getting everything in shape for the beginning of work at their properties at Jackson. The first call for assessment on the stock already subscribed will not be made until they are ready to begin operations at the mine.

CALAVERAS COUNTY.

H. G. Murray, who has had the position of foreman and head mechanic at the Gwin mine ever since it was reopened under the present management, has been given the responsible position of superintendent of the Lightner mine at Angels camp.

INYO COUNTY.

Emerrick & Dover will have a mill at Stone Corral in two weeks, the machinery being now at Johannesburg.

Parties who bought out Lambert, Grey & Tate at Avril Springs will have a mill on the ground in less than a month.

Al Williams has bonded his property at Tuber for \$20,000.

Jim Wingfield has sold his two claims above Stone Corral and gone recreating.

Mr. Quinn will put up cyanide works on the Montgomery Bros.' tailings dump, and then take hold of some mine with the same process.

Ed Cross is working the Santa Rosa, Phil Glaser the Comet. Both are milling their ore at Ballarat custom mill.

Stotler & Day have men taking out ore from Mineral Hill and Snow Canyon properties.

Shep is milling ore from one of his claims. Johnnie Cross and French are doing the same.—*Inyo Register*.

KERN COUNTY.

George Otterman is down from Breckenridge. He reports that he has sold his one-fourth interest in the Crystal mine to R Patterson Fox. The two-stamp mill at the mine is now in operation, and a clean-up will be made in a short time. H. Vincent Wallace is operating the mill.

Considerable interest has been aroused within the week over the finding of placer gold near the St. Elmo mine. Holes have been sunk to bedrock and a rich streak of gravel found just before bedrock is reached. This gravel runs from eighteen inches to three feet and is found to be rich. A number of holes have been sunk, and so far the bedrock has been reached in the deepest place in a lit-

tie less than forty feet. It is in the draw running down from the Stringer district, and much of the gravel is composed to fine quartz.

Dr. Waite and two or three others associated with him, have taken out a carload and shipped it to Barstow to have it run through the mill. The result will be watched with interest. If it will go \$10 per ton there is a big thing in it, and it is expected to go much higher, for on the upper side of every boulder found near bedrock coarse gold is found.—*Randsburg Miner.*

LOS ANGELES COUNTY.

Isaac Bayliss and company have put up a new testing mill in the Tejunga.

Messrs. H. Rebbeck and E. L. Baker have recorded and opened up some very good mica mines near Acton. Some blocks are taken out that measure nearly five inches square.

The Red Rover Company have made another fine clean-up. The brick taken to town was worth nearly \$1300. It was from 115 tons of quartz. The company have only run their mill part of the time on account of some very needed development work that is going on now. Some good improvements are going on in the rebuilding of the Superintendent's residence; also a new road to the hoisting works has just been made.—*Acton Rooster.*

MONO COUNTY.

Wm. Fulton, who has been working on Harrison Berry's copper mine in Antelope valley, shipped a large piece of ore to the State University to be tested. The mine is very rich in copper and carries some silver. The ledge is a very large one, the croppings showing a width of 21 feet. Mr. Fulton sunk a 15-foot shaft on the ledge and encountered rich copper ore all the way down. The mine is situated in the Sweetwater mountains a few miles east of Antelope Valley. The copper ledge runs parallel with a marble ledge, also owned by Mr. Berry, and which forms one of the walls. The other wall is slate. Mr. Fulton thinks it a very fine property and liable to attract the attention of capital before long.

RIVERSIDE COUNTY.

Water Rights and New Mines Recorded.

The following mine and water locations have been recorded since last report:

C. D. F. Case locates a water claim in the Winchester district.

C. H. Briggs files location on the Daisy mine in the Perris mining district.

H. F. McCallum of Palm Springs files on 2000 inches of water in the South Fork, and also 1000 inches in the North Fork of the Whitewater river. The water is to be used for mechanical purposes, for generating electricity, etc.

Melvin Stone has filed on 1000 inches of water of the Temescal creek.

W. A. Doran filed on a mill site location in section 8, township 7 south, range 11 east.

Johnson & George, lessees of the Good Hope mines, are working in some of the most valuable ore that has ever been found in that mine. They have been offered \$3,500 for the ore they have unearthed so far this month, but have refused the offer.—*Riverside Enterprise.*

SAN DIEGO COUNTY.

In his fourteenth monthly report filed in court in San Diego, the latter part of Febru-

ary, Receiver Charles W. Pauly of the Golden Cross mines at Hedges says: The cleanup of the 100-stamp mill for January was \$30,796.60 and \$1,086.99 was received from other sources. The pay roll for the month was \$8,000, fuel cost \$800 and the current expenses amounted to \$8,000.

TUOLUMNE COUNTY.

There is talk of the Bell starting up shortly. The vein is big and has been sunk on 400 feet.

In the Excelsior shaft the hard rock holds out, and considerable difficulty is experienced in making the steel stand.

Boiler and engine for the San Giuseppe will soon be on the ground and pumping commenced as soon as a supply of water can be secured.

At the Turner Flat, the new shaft is down 44 feet, with further sinking progressing at a lively rate. Every indication points to the fact that this shaft is directly in the main channel.

The 10-stamp mill on the Mammoth, of which control was recently secured by the owners of the Republican, is making a run on rock from the latter, and indications point to a good cleanup.

The Purdy vein, a parallel location to the Hazel Del, is being worked by the same company operating the latter property. A tunnel was run in on the vein, and six tons of ore shipped to Selby's for treatment gave returns of \$46.65 per ton. The vein is 18 inches wide and the whole ore and formation bear a striking resemblance to that found in its noted neighbor.—*Sonora Union-Democrat.*

COLORADO.

Josephine City is the newest camp on the Gunnison gold belt. It is 18 miles west of Gunnison City by stage, and eight miles west of Iola. One of the claims has a 65-foot shaft, with assays ranging from \$20 to \$34,000 per ton. The name of the assayer is not given.

A body of gold ore 18 inches wide has been encountered in the 400-foot level of the Centennial mine, at Georgetown, that is said to run 84 ounces in gold to the ton and six ounces in silver. The Centennial is an old property, has been worked for over twenty years, and is credited with a production of over \$300,000.

A great deal of active work is now going on at the Pennsylvania mine, Boulder county, under the management of George W. Teal. The property is owned by the Yukon Mining company, which is composed of Boston capitalists, and is a close corporation. Over \$10,000 has been spent this season in sinking shafts and drifting, and work is progressing at the rate of three feet a day. The property now has 2,300 feet of tunnel, a 500-foot shaft and 100 feet of double compartment shaft has been sunk in the last thirty days. A shipment recently made ran over \$28 a ton, but it is the intention of the management to develop the mine fully until July, when steady shipments will be made.—*Ores and Metals.*

Cripple Creek News.

Carl Johnson, leasing on the Half Moon, owned by the Mattoa company, is now outputting at the rate of 35 tons per day of \$35

rock. He recently sent out a 60-ton shipment of about two-ounce grade.

Warne and Griffin, the lessees on the 100-foot level of the Lucky Guss, marketed 14 tons of ore, of which four tons was smelting grade of seven-ounce value, and the remainder mill ore of about \$30 to the ton.

A carload of ore was shipped from the Wagan and Marquis lease on the May Queen, on Womack hill, estimated to return values of two ounces to the ton. The ore came from a drift run at the 100-foot level. The May Queen is owned by the Cripple Creek Consolidated company.

The different lessees on the Vindicator company's ground are making regular and heavy shipments. During the past week Johnson and Hoskins sent out three carloads of three-ounce rock. Dubois and Cornell two cars of \$30, and the Baltimore Leasing company, sixty tons of the same grade of ore. The mine is now producing on an average 120 tons a week.

The production from the Dante last week amounted to about 65 tons, as follows: One car from the Johnson shaft settled for on the basis of \$68.40 to the ton; one car from same place, \$27.40 to the ton; another car from Johnson shaft, \$22 to the ton; half a car from this shaft, \$60.10 to the ton; one car from this shaft, \$19.50 to the ton; also 15 tons from the Close Shave lease, the returns on which have not yet been received.

IDAHO.

A mining deal involving \$200,000 on properties in the Seven Devils has been practically closed. The properties have been bonded to Louis A. Hall and associates and a large cash payment is to be made on the first of June next.

The properties consist of a group of four claims lying east and west of the Peacock mine, and joining the same, being the Rodie, Standard, Badger and Confidence, owned by Ed Barton, A. N. Tousley, M. Ward and Andrew Adams.

The Lockwood group, lying on the west end of White Monument mountain, and consisting of the Pomeroy, Lockwood, Lookout and Sampson, and owned by A. M. Gray, Ed Barton and the Conrad Fruth estate.

The Tusse group lying northwesterly from (and across Kinney creek) the White Monument, and consisting in whole or part of the Tusse, Last Chance and Hidden Treasure, and owned by A. N. Tousley, Al Donart and Chas. Anderson.

The Legal Tender Exploration, Development and Mining Company filed its articles of incorporation. The incorporators are A. C. Blue, E. D. Gallagher, P. F. Greene, W. H. Hare, C. G. Rice, P. Johnson and W. H. Smith, all of Burke. The capital stock consists of 400,000 shares of the par value of two cents each. Its principal place of business is Burke, and besides owning property in the Coeur d'Alenes, Buffalo Hump and the Cascade range, Wash., the company will have a prospector out this summer to locate more ground.

MICHIGAN.

Tri-Mountain, near Ishpeming, has ordered a hoisting plant, and will begin operations as soon as the weather will permit. Just now all the newer properties are idle by

reason of the big snow storm of last week. The Mass has placed its order for a plant of machinery, and as soon as the snows go will be ready for business.

Iron Ore, published at Ishpenning, Mich., contains an article regarding the Chapin mines, near Iron Mountain, Marquette county, in which it says: "The Chapin Mining company continues to keep up the good work inaugurated when it took hold of the Chapin mine, and from a most unsatisfactory underground condition, has brought forth order, millions of tons of ore, a profit to its stockholders, and has paid to its workingmen the highest ruling wages. It has brought into use modern methods of mining, the best of machinery, a skilled organization, and much energy, a combination that cannot fail of success where natural conditions permit. The company has been progressive, and the activity of its property gives to the city of Iron Mountain much of its business health and population. Important to the future of the town is the fact that the Chapin never looked better than today, and that the deposits of ore give every encouragement for large annual outputs long into the future. The hundreds of thousands of tons mined and marketed each year make big holes in the leases, true, and the end must some day be reached, but the exhaustion will not be recorded in the history of those now employed there, and beyond this period little heed will be taken by our readers."

MINNESOTA.

Last year over 5,000,000 tons of iron ore were mined in Minnesota adjacent to Duluth and shipped down the lakes from Duluth, Two Harbors and Superior. Iron ore is mined in Wisconsin, but none of it is shipped from Superior, Ashland, seventy miles down the lake, being the shipping point.

The head of the lakes is the natural manufacturing point for pig and structural iron for all consumption in the territory west of Duluth to the coast. But the furnaces and factories in the east can supply the present demand, and it will require something of a struggle for the northwest to get what it is justly entitled to. Men may soothe themselves with the thought that eager capital will seek such a location, and that encouragement is unnecessary. But such theorizers are ignorant of the facts. The Minnesota mines are owned or operated by the same companies that own the railroads and steamboat lines that transport the ore, and the furnaces and mills in the east that manufacture it. And even if they could manufacture iron cheaper in Duluth than in Cleveland, Chicago or Pittsburgh, they would lose the lake freight, which on the total shipments of last year was about \$3,000,000. And though manufacture here would give them freight for coal shipments, this is offset by the freight now earned in the reshipment from the east of all iron for western consumption.

MISSOURI.

At the Blue Bird, on the Gray land, they will put in a steam hoisting plant shortly.

The White Oak, east of Joplin, has an eight-foot face of excellent ore in timbering ground.

The Eagle, at Belleville, sold 115,270 jack,

and the Arkansas on the same lease 32,840.

A one-fourth interest in the Thanksgiving mine at Central City has been sold for \$6,000.

Chas. Earle has sold his interest in the Eagle mine at Belleville to W. C. Freeman, of Providence, R. I.

The new concentrating mill of the Pilgrim mining company at Cave Springs will start up soon.

The Fourteen mining company on the Empire Co.'s Kobinoor tract, turned in 108,770 of jack and 2100 of lead.

A good prospect has been opened up at thirty-five feet on the South Carterville land by Ed and Leon Jenkins.

The Ground and Irwin mines at Duenweg has made a big strike at 155 feet, where the miners are taking up stope.

The Auriferous mining company are developing an eighty-acre lease of the Worler farm, two miles north of Oronogo.—*Joplin Herald*.

MONTANA.

Just as the lease held by Messrs. Cutler, Wilkinson & Co. on the Golden Sunlight group of mines at Whitehall expired a body of very rich ore was encountered. A dozen men are at work on the property now, and are under the supervision of Mr. Evans. The miners, with few exceptions, are Butte men, and are a part of the Modoc crew. It is said that the American Development company will spend about \$10,000 in putting the property in shape, after which it will give employment to at least 100 men in operating the large workings.

The Parrot mine, for the year ending June 1, 1896, produced about 15,000,000 pounds of copper and made a net profit of \$750,000, selling the copper at less than 11 cents per pound. Had it sold its copper at 17 cents per pound it would have earned an additional \$900,000. Parrot ore, we are informed, is now running 40 per cent better in value than last year. This being the case, it would mean an additional gain of \$640,000. This would give net earnings for the present year, based on the production of last year, of \$2,290,000. The company is now constructing a new smelter, and when same is completed it will be able to handle three times the amount of ore it is now handling. Parrot, in a year's time should therefore be earning over \$6,000,000 on 17-cent copper, and therefore be earning over \$3,000,000 on 11-cent copper.

Foreman Buckley of the Lowlands near Basin, says they have not yet found ore on the 400-level. The owners are not in the least discouraged, as they believe they will yet find ore in large paying quantities. The Ruby has produced \$350,000 worth of ore from the extensive high grade chute that was encountered on the upper levels, and they will continue to prospect the mine until more ore is found, if any exists in the property, and it certainly does. That is the way to go after it. The owners of the Ruby show genuine pluck in mining, and pluck generally wins.

NEVADA.

W. M. Bartee, who went out to the Searchlight mining camp a few days ago, has re-

turned to Riverside, Cal., from his trip. Mr. Bartee comes home well pleased with the mining outlook in that section of the country. The Searchlight camp is located in the southernmost corner of the state of Nevada, in fact, just across the line from this state. He says there are about sixty men there at the present time, all of them being busy at work on promising mining properties. Mr. Bartee tells of an assay that Mr. Thompson of Riverside has just had made of some ore taken from his (Thompson's) mines, and the rock went \$126 gold to the ton. Mr. Bartee is interested in one or more very promising mines in the district. Messrs. Collins and Noble, who went out with Mr. Bartee remained at the camp, where they will be for some days.

Henry Jagels contemplates putting up a five-stamp mill near Silver Peak.

George Olesen and John Smith are working on a claim near Jagersville for Fred Weber.

Joe Prout has taken a contract to run a 200 foot tunnel for Louie Chiatovich on the Rattlesnake mine, near Silver peak.

Jim Verington is in San Francisco negotiating the sale of a large copper proposition near the Brunswick mill, on the Carson river. It is said the sale is sure to go.

A lot of lumber has been shipped to New Boston for the Fagan copper mines. It will be used in building three boarding houses at the mines. This looks like business.—*Walker Lake Bulletin*.

NEW MEXICO.

Output of Hillsboro Mines.

Output of Hillsboro gold mines for the week ending Thursday, Mar. 16, 1899, as reported for the *Advocate*:

	TONS.
Wicks.....	20
K K.	15
Richmond	35
Snake Group.....	65
Opportunity.....	20
Sherman	5
Cincinnati.....	10
Trippe.....	55
Rex (silver-lead)	5
Total	110
Total output since January 1, 1899—	3,065.

OREGON.

Following upon the heels of the payment of the full price of \$60,000, cash, for the Collateral mine, adjoining Baker county's oldest bullion producer, the Virtue, the acknowledged rich mother lode of that district, comes the information that the Virtue Consolidated Gold Mining Company will also become sole owner of the Virtue mine.

The last dollar of the \$35,000 purchase price of the Virtue, is to be paid within the time specified and this practical double deal will be followed by very extensive work, both in the Virtue and the Collateral.

A very rich strike has been made in the North Pole, and the Baker City *Democrat* is reliably informed that ore worth upwards of \$3,000 per ton is being taken out.

A carload of ore from the new strike will

soon be shipped for reduction, and it is estimated that the handsome sum of \$50,000 will be realized.

SOUTH DAKOTA.

Black Hills Notes.

A cave in the Terra mine displaced several million cubic feet of earth and rock. The cave has been expected for some time, and as it occurred in an abandoned stope, no one was injured.

Work has been resumed again on the property east of Ruby Basin, in which James Toby of Englewood, and M. C. Campbell and associates of Lead, are interested. Very good prospects have been opened up.

Work on the shaft being sunk on the Kilpatrick ground at Ragged Top is moving along smoothly, and a depth of 480 feet has been attained. The ground is looking well and the indications are very promising.—*Mining Review.*

UTAH.

Notes on Various Mines.

The Ajax mine at Mammoth is reported to be looking well. The third and fifth levels of Lower Mammoth are making a good showing.

At Park City the Alliance properties are producing some magnificent ore. The working force at the Daly-West mine is being increased as rapidly as room can be made.

Bullion-Beck and Champion Co. of Eureka paid the regular dividend on the 15th of 10 cents, amounting to \$10,000. No change is reported from the Centennial-Eureka properties, the grade of ore holding out well. Operations on the Eagle and Blue Bell properties are being vigorously pushed.

Numerous deals are being consummated near the Dalton & Lark Co.'s properties at Bingham.

WASHINGTON.

Another free gold strike in the Waterloo mine at Camp McKinney, Colville Reservation. The ore is looking better than any yet. Free gold is mixed through the whole face of the drift. It is beyond question the best ore ever struck in camp. The ledge was mixed while crossing the gulch for 13 feet, but now they are into solid ground again, hence the encountering of the rich ore. The free gold is considered more important now than ever, as it is not in bunches, but through the entire ledge. The ore is more heavily mineralized than before in sulphurites and galena. It is now beyond all doubt that the Waterloo is a great mine.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

East Kootenay Mines.

A Victoria syndicate has purchased the Wasa group, which is situated on Wasa creek, north of Fort Steele.

Development work consists of a tunnel which is in some ninety feet. The vein at this point is from four to six feet in width. The ore is a quartz carrying grey copper, red

oxide of copper and galena. Assay returns have run as high as 22 per cent copper, 112 ounces in silver and \$10 in gold.

Development work on the North Star mine is progressing rapidly. The main shaft has reached 200 feet. A station has been set and drifting will be commenced from this point.

The tunnel on the Stem-Winder is now in 80 feet. The top, both sides and bottom are in solid ore.

Ore Shipments.

The shipments of ore over the Kaslo & Slocan railway for the week ending March 16th, as reported for the *Kootenaiian*, were as follows:

Mine	Destination	Pounds.
Payne	Omaha	313,000
Last Chance	San Francisco	160,000
Last Chance	Aurora	16,000
Jackson	K O Co.	90,000
Reco	Aurora	40,000
Rambler	Aurora	40,000
Total		803,000 pounds, or 401 $\frac{1}{2}$ tons.

LOWER CALIFORNIA.

The Piramide mines, in Lower California, are in splendid condition for active operations. The machinery is now no doubt in the best of shape for work and active operations will be inaugurated at once. The work of getting the machinery in place had only just been completed, and a test made of it shows that the work has been done well and no doubt but that everything will work smoothly when the work starts in earnest.

The Ybarra Mining Co. of Calmalli, recently sent up a shipment of gold concentrates valued at \$3,500, together with a bar of bullion netting them \$2,000 from their mines near Calmalli. The 40-stamp mill began crushing ore on the 15th of March. The mill is the largest on the Pacific Ocean side of the peninsula, and can handle 100 tons of ore a day under ordinary circumstances. The Ybarra mines have never been operated to their full capacity, but the company has now plenty of money to put things on a sound basis and develop the mines on a large scale. Nearly 200 men will be at work on the property soon, and it is believed the bullion output will then exceed \$30,000 per month.

San Francisco is the home office of the Ybarra company and in consequence many of the supplies are purchased there.

MEXICO.

All Over Mexico.

This week the Jesus Maria second silver mine was denounced near Mineral del Monte, state of Hidalgo.

The Santa Clara and Tres Hermanos are the names of two new copper properties denounced in the last few days near Tuzanilla, state of Michoacan.

A party of capitalists from Mexico City, have been in the Magistral district this week, looking up copper properties. It is reported they intend to invest. They returned to Chihuahua Thursday night.

The Hidalgo Mining Co.'s new tramway is about completed, and it is reported that this company in connection with the house of Stallforth, will construct another tramway about a mile long.

Development has progressed so well upon the gold properties of Mr. W. S. Sturges in the Altar district, that necessary reduction machinery will be ordered at once, and the gentleman is arranging for construction of a short line of railway from the gulf coast at Adair bay to the mines, a distance of nine miles.

A new exploration and development company, to prospect and work mines in the Yaqui country, about La Dura and that vicinity, has been recently organized at Prietas. There are about a dozen gentlemen interested, including Dave Richardson, J. H. Higgins, Frank Lesser, Willis MacGuise, Frank Richardson. The stock—\$100,000—is all subscribed.

PERSONAL NEWS ITEMS

W. G. GUNNISON of Los Angeles, who has mining interests in the Republic of Columbia, South America, left last week for New York where he embarks for that country.

OLAF ELLISON, the special representative for the United States for the Pacific Coast to the Paris Exposition, 1900, has just left for San Francisco.

COL. C. H. DAY has lately returned to Deadwood, South Dakota. He has been in Chicago, Ill., for some time, attending to some mining business.

M. L. FOX, at one time the editor of the *Daily Independent* of Deadwood, S. D., has lately purchased 2,500 shares in the Holy Terror-Keystone Consolidated Co.

ALFRED C. BELL, contracting engineer for the Wisconsin Bridge & Iron Co., is in Deadwood, S. D., where he will remain several weeks looking over the different mining camps in the vicinity.

E. H. WEBSTER has lately resigned the superintendence of the Grand Central mine, Minas Prietas, Sonora, Mexico.

L. S. MCCLURE of San Diego, Cal., is in Neihart, Mont., looking at some prospects in the Little Belt Mountains.

H. J. NORWOOD, with several others, have taken up some valuable placer ground near the Antone Rose ranch, Williams Creek section, Ore.

FRANK P. SWINDLER has been appointed superintendent of CAPTAIN DE LAMAR's Nevada mines.

WM. HEIMROD of the Kingman Sampler at Kingman, Arizona, was one of the visitors to the JOURNAL last week. Mr. HEIMROD reports everything in a prosperous condition in Mohave county.

CHAS. CADMUS, the mining expert, has taken a bond and lease upon the Montezuma group of claims near Rockford, S. D.

C. R. ROWE, representative of English capital, is in Grass Valley, Cal., examining the Eagle Bird claim at Maybert.

G. P. MACKAY has his new machinery and concentrating plant about ready to start up, at the Santa Barbara, Calif., Mex.

JONATHAN BOURNE, one of the chief owners of the E. & E. mines, at Republic, Wash., is erecting a \$40,000 mill on his claim.

FRANK NICHOLSON of New York City, is in the Joplin District, Mo., examining some mining lands.

JAY A. CZIZBER has been elected State Inspector of Mines for the state of Idaho, with headquarters at Boise, Idaho.

NICHOLAS TREWEEK of Salt Lake City, Utah, has lately left for the east to attend to some mining business.

SURT. D. T. MORGAN of Republic mine, Coleville Reservation, Wash., was in Ishpeming, Mich., a few days on business.

T. REGAN, a mine owner from Idaho, is in San Francisco.

J. W. EVANS has been appointed manager of the Four Aces mine, Tintic, Utah.

JAS. CUSH of Lead, S. D., has lately been appointed mining inspector for South Dakota.

CHAS. HUTCHINGS, advertising solicitor of the *Engineering and Mining Journal*, of New York, is visiting in Los Angeles, Cal.

PROF. R. C. CARPENTER, Sibley College, Cornell University, is now engaged in making a series of exhaustive tests with Cling Surface Belt Dressing. A preliminary report just made shows most surprising results to us as to the increase of transmitting power of belts from its use. A full report, with diagram of curves, will be shown in our May issue.

THE MARKETS.

All quotations, financial reports and other statistical information given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue and constitute a very accurate compilation of statistical matter.

NEW YORK, March 14, 1890

The following are the Silver, Copper and Lead quotations for the last two weeks:

	SILVER.	COPPER.	LEAD.
Mar. 15	60½	17 50	4 20
16	60½	17 50	4 20
17	60½	17 50	4 20
18	60½	17 50	4 20
19	60½	17 50	4 20
20	60½	17 50	4 20
21	60½	17 50	4 20
22	60½	17 50	4 20
23	60½	17 50	4 20
24	60½	17 50	4 20
25	60½	17 50	4 20
26	60½	17 50	4 20
27	60½	17 50	4 20
28	60½	17 50	4 20
29	60½	17 50	4 20
30	60½	17 50	4 20

SILVER.

The silver market has been quiet, with business done at slightly declining rates. It is to be noted, however, that the rates for spot and future have been converging so that March silver has commanded a price only a little under metal for prompt shipment.

COPPER.

The market has been fairly active. Copper for early deliveries remains very scarce and a number of producers are reported as being still in arrears with shipments. Consumption is constantly increasing and brass manufacturers report the volume of business as unprecedented. We quote for Lake, \$11.50; electrolytic in cakes, wirebars or ingots, \$16.50; electrolytic cathodes, \$16.25; casting, \$16.25.

LEAD.

The market continues strong and active and prices have further improved. We quote New York at \$4.45 and St. Louis at \$4.27½.

SPOTTER.

The market has been good, and prices are increasing with St. Louis quoting at \$4.30@5.95c., and New York at 6.15@6.20c.

ANTIMONY.

The antimony market is unchanged. We quote Cookson's, 10c.; Hailett's, U. S., Star and C., 9½c.

NICKEL.

Business still continues on unchanged lines and no alteration in prices can be reported. We quote for New York ton lots 33½c. and 36c per lb and for smaller orders 35½c. and 38c.

TIN.

The market for tin has been somewhat stronger this week. We quote the metal at 23@23½c.

PLATINUM.

The demand is active and prices still continue high. New York is quoted at \$16@\$17. The London quotations are 62@64s. an oz.

POTASSIUM CYANIDE.

Purified, 98@99 per cent., in cases of 120 lb. at 32c. per lb, in 5, 10, 25 and 50 lb tins at an advance.

QUICKSILVER.

The New York quotation remains at 812 per flask. The London price is £8 5s with £8 4s named for second hands.

POWDER.

F. o. b., San Francisco: No. 1, 70 per cent. nitro-glycerine per lb, in carload lots, 15½c less than one ton, 17½c per ton, 10 per cent., carload lots, 13½c; less than one ton, 15½c. No. 1** 50 percent, carload lots, 17½c less than one ton, 12½c. No. 2, 40 per cent., carload lots, 10c; less than one ton, 12c. No. 2*, 25 per cent., carload lots, 9½c; less than one ton, 11½c. No. 2** 30 percent., carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car, 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

COKER.

The trade in coke at St. Louis is reported very quiet—a condition not unusual as the year draws to a close.

IN CAR LOTS, ST. LOUIS.

Connellsville fly coke 72 lb. fr. \$1.85
New River....\$4.00 Pocahontas.... 3.90
Crushed..... 4.85
Gas works coke, lump, per bushel.. .10

BORAX.

The San Francisco market in Borax is firm with a good demand.

The market is quoted as follows:

Refined, in carload lots, in barrels..... 7½
Refined, in carload lots in sacks..... 7½
Powdered, in car lots..... 7½
Concentrated, in car lots..... 7½

THE MINOR METALS.

Quotations are given below for New York delivery:

Aluminum.	Al. 1, 98 per cent., ingots, per lb.....	33@40c
No. 2, 90 "	" " "	31@34c
Rolled sheets, per lb.....	38c up	
Aluminum.—Nickel, per lb.....	11@12c	
Bismuth, per lb.....	\$1.10@1.20	
Phosphorus, per lb.....	40@50c	
Tungsten, per lb.....	70c	
Perro-tungsten, 60 per cent.....	60c	

Variations in price depend chiefly on the size of the order.

CHEMICALS.

There has been an increased consumption of alkali, caustic soda and bleaching powder. It is said that domestic makers of caustic alkali are generally sold up for the next four months, and in some cases special odds have been offered at \$1.50@\$1.70 per 100 lbs.

CAUSTIC SODA.

Quotations for caustic soda, domestic high test, 1.25@1.40 per 100 lbs. f. o. b. at works \$1.50@\$1.65 delivered.

ALKALI.

Domestic, 60@65c, f. o. b. works; 70@75c. delivered; foreign, 80@85c.

CARBONATED SODA ASH.

58 per cent., 90c and 95c. per 100 lbs. basis 48 per cent.
DI-CARBONATE OF SODA.
American, \$1.12½, m. \$1.25 English
\$2.12½/\$2.25 per 100 lbs. according to brand and style of package.

SAL-SODA.

For domestic 50c. per 100 lbs., less the usual discounts; English, 60@62½c. per 100 lbs. Concentrated sal-soda, \$1.60 or \$1.70 per 100 lbs.

CHLORATE OF POTASH.

Chlorate of potash is quoted at \$8.87 @ \$9.12½ for crystals and \$9.37 @ \$9.50 for powdered per 100 lbs.

CHLORIDE OF LIME.

English prime brands \$1.60@\$1.70 American, \$1.70@\$1.80; Continental F. \$1.50@\$1.60 per 100 lbs.

ACIDS.

Business is good and delivery contracts are active. Exports continue large while prices are firm. A still better business for the next few months is looked for and the market seems to be much easier.

BELTS WILL SLIP — BUT

CLING-SURFACE

WILL STOP IT PERMANENTLY.

CLING-SURFACE is to be applied to the inside of a belt.

It has been so universally satisfactory for the past three years that we can safely guarantee that its use will not only stop all slipping, but that the belts will become soft and pliable, yet firm; if of leather, they will become as soft as calf skin, and also absolutely water-proof; and furthermore we guarantee that the belts can be run slack, and that the power will be increased so much that in a fair-sized plant the cost of the sample can will be earned monthly.

This applies to all belts, leather, cotton, rubber or a rope drive, whether new, old, or oily. We will send you a sample can for trial; or, if you prefer, we will advise you further as to its nature.

CLING-SURFACE MFG. CO., 167-172 VIRGINIA ST., BUFFALO, N. Y.

REPRESENTED IN SALT LAKE BY THE UTAH RUBBER & MFG. CO.

A Practical Test ...

We asked a man the other day what he thought of our pumps.

"Well," said he, "I've used this pump for twenty years, and it's better than most pumps yet."

The best material, workmanship and patented construction—that's why our pumps wear.

Are you going to buy—Write us for full information and catalogue. All free for the asking.

W. T. GARRATT & CO.,
Pump, Bell, Brass and Machine Works,
138-142 Fremont St., San Francisco, Cal.

MINERALS WANTED

Gold and Silver Quartz Specimens, Crystals, Opals, Turquoise, etc., etc.

Buy in Any Quantities—Pay good prices—Cash

E. C. MOLLER,

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The Pulsometer Steam Pump

"THE MINER'S FRIEND"

Often Imitated—Never Equalled

Over 20,000 in Use

RECENT IMPORTANT IMPROVEMENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining Quarrying, Railroad, Irrigation, Draining, Coal Washing, Tank Filling and for Pumping back Liquids heavily impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump.

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CATALOGUE ON APPLICATION
CORRESPONDENCE SOLICITED

Pulsometer Steam Pump Co.

133 Greenwich Street, New York City

THE MINING AND METALLURGICAL JOURNAL

10

BRIMSTONE.

The arrivals at this port—8,200 tons—this week have eased the market, and spot best unmixed seconds are quoted at \$22½ to \$23, and shipments at 50c. per ton less. Best thirds are \$20 to \$21 per ton.

NITRATE OF SODA.

The demand is still quiet. An arrival of 25,680 bags is noted. There were sellers at \$1.61⅓ per 100 lbs. but no buyers. Second hands are asking \$1.62½ to \$1.66 for spot. Buying for future delivery is very quiet and consumers are not offering over \$1.50.

FINANCIAL NOTES.

Average Prices of Metals

In New York per pound from January 1, 1898:

Month	Copper	Tin	Lead	Spelter
January	11 7/8	9 1/4	4.18	5.34
February	12 1/2	9 1/2	4.49	5.28
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
Average				

Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st, 1890, and for the years 1893 and 1897:

Month	1890	1893	1897
January	59 1/2	60 7/8	61 7/8
February	59 1/2	58 1/2	61 7/8
March	—	54 1/2	63 1/2
April	—	56 1/2	61 1/2
May	—	56 1/2	60 42
June	—	58 1/2	60 10
July	—	59 1/2	60 10
August	—	59 1/2	61 19
September	—	60 1/2	65 24
October	—	60 1/2	57 51
November	—	60 1/2	57 91
December	—	59 1/2	58 01
Year	58 26	59 79	60 79

The statement of the United States Treasury, on Thursday, Mar. 16th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Mar. 10	Changes,
Gold	\$71,32,852	I. \$4,475.78
Silver	15,37,05	D. -1,17,416
Legal Tenders	14,29,050	D. -1,17,416
Treasury Notes, etc.	125,1731	
Total	120,79,319	I. \$4,475.78

Treasury deposits with national banks amounted to \$90,590,514, a decrease of \$6,319,075 during this week.

Gold and Silver Exports and Imports.

At all United States ports, October 1898, and year from January 1st, 1898, and 1897:

FEBRUARY			
Gold—	1898	1899	
Exports.....	\$1,030,412	\$124,840	
Imports.....	6,162,681	\$148,906	
Excess.....	I. \$5,132,269	I. 4,824,066	
Silver—			
Exports.....	\$3,759,971	\$4,561,119	
Imports.....	2,085,635	1,627,017	
Excess.....	R. \$1,674,336	R. \$1,935,102	
YEAR			
Gold	1897	1898	
Exports.....	\$3,980,072	\$2,655,143	
Imports.....	12,056,000	11,124,086	
Excess.....	I. \$8,067,020	I. \$5,559,643	
Silver—			
Exports.....	\$ 8,061,861	\$9,941,066	
Imports.....	4,621,096	4,018,745	
Excess.....	R. \$ 3,440,695	R. \$ 6,922,351	

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

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Arnold	9 75	Nipper	10 00
Atlanta	37 69	Old Colony Min	18 87 1/2
Banbury	1 87 1/2	Old Dominion	46 50
Boston & Mont'g	70 00	Oacella	50 00
Breeze	2 00	Parrot	45 00
Butte & Boston	9 00	Pioneer	2 37 1/2
Cabinet & Heater	13 00	Quincy	18 00
Catalpa	35	Rhode Island	13 50
Centennial	46 00	Tamaronk	23 50
Cochiti	13 75	Temecula	5 75
Crescent	5 50	Victor	5 50
Domestic Perf	118 50	Utah Mining	40 50
Franklin	25 00	Washington Min	4 00
Gold Dredging	34 50	Winton	18 00
Humboldt	2 50	Wolverine	47 00

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Brand'n & G'd'C'k	60	Lilly May	-
Big Three	15	London B. C. G. F. S	8 00
Brit. Amer. Cor	4 50	Le Rot.	7 00
Butte	2 00	New Goldfield	1 50
Brit. Col. Cor	2 50	Novelty	05
Commodore	10	On the Beach Prop	3 75
Donald C'd Fields	10	Rambler Con	30
Caribou	1 50	Red Mountain	View
Deer Park	10	Rito	-
Dundee	45	Silver Bell	05
Kensington Star	10	Sarah Lee	25
Kern	26	Silverine	05
Georgia	2 00	Silver Queen	16
Gold Fields of B.C. 4	50	St. Elmo	-
Hattie Brown	0 00	Slocan Star	2 45
Hall Mines	3 00	Vic. Tr. Dev. Co.	0 00
High Ore	0 00	Waverly Mines	3 00
Homestake	0 00	West Le Rot.	28
Iron Mask	80	War Eagle Con	3 50
Kenneth	25	White Bear	10

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Andes	18	Occidental	52
Bolcher	21	Ophir	50
Best & Belcher	16	Overman	07
Bullion	10	Ontario	3 50
Caledonia	52	Plymouth	08
Challenge	13	Potosi	23
Chollar	10	Quicksilver	1 25

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Acantha	0 00	Imbellia	1 00
Alamo	0 00	Jack Pot	1 00
Anchorage	0 00	Jillie	0 00
Anaconda	0 00	Kimberly	10 00
Argentum Junta	10 00	Magnet Rock	0 00
Bellota	0 00	Banner	0 00
Bob Lee	0 00	Montana Rock	0 00
Breeches	0 00	Mountain Beauty	0 00
Brown	0 00	Mollie Gibson	1 00
Des Moines	0 00	Moon Anchur	0 00
Rikton Con	1 00	Mount Rosa	0 00
Eli Paso	0 00	New Haven	0 00
Emma Alice	0 00	Ortiz	0 00
Fanny R	0 00	Gibraltar Bell	0 00
Favorite	0 00	Peoples	0 00
Findley	0 00	Pharmacist	0 00
Flower of the West	0 00	Pilgrim C	0 00
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Golden Fleece	0 00	Pr. Albert	0 00
Gold King	0 00	Rattler	0 00
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Hayden	0 00	Standard	0 00
Hingham Con	0 00	Union Gold	0 00
High Five	0 00	Work	18 1/2

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Alliance	50	Lower Mammoth	88 1/2
Amelia	75	Mammoth	1 84
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Bullion Back	4 50	Northern Light	64
Cont. Buroka	4 25	Omaha	42 1/2
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Dalton	1 12	Piney	1 00
Dalton & Lark	0 00	Portland	42 1/2
Daly	1 21	Sacramento	42 1/2
Daly West	10 12 1/2	Silver King	33 00
Dexter	2 5	Star Consolidated	1 12
Rugie	66	Sunbeam	56
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Four Aces	38	Swansea	3 80
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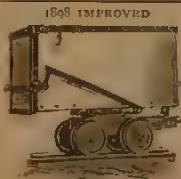
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NAME OF MINE	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount	Rate of Dividend
1 Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Jan 1890	\$ 1,000	G.
2 Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	Jan 1890	750	C.
3 Alaska Mexican.	Alaska	200,000	1,000,000	1	10	Jan 1890	200	C.
4 Alice.	Montana	400,000	10,000,000	25	50	April 1898	2,000	G.
5 Anaconda.	Montana	1,200,000	30,000,000	25	1 25	Nov 1898	3,000	G.
6 Anchorage Leland	Colorado	600,000	600,000	1	08	Jan 1890	360	G.
7 American Gold	Colorado	800,000	3,000,000	10	09	Oct 1898	360	S.
8 Associated.	Colorado	1,250,000	1,250,000	1	01	Dec 1898	125	G.
9 Aurora.	Michigan	100,000	2,500,000	25	50	May 1898	500	G.
10 Bald Butte.	Montana	250,000	250,000	1	06	Dec 1898	62 1/2	S.
11 Big Six.	Colorado	500,000	500,000	1	00 1/2	May 1898	500	S.
12 Boston and Colorado Smelting	Colorado	15,000	750,000	50	5 00	Jan 1890	75	S.
13 Boston & Montana	Montana	150,000	3,750,000	25	5 00	Feb 1890	387 1/2	G.
14 Breece.	Colorado	200,000	5,000,000	25	50	Mar 1890	1,000	G.
15 Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Feb. 1890	100	G.
16 Bunker Hill and Sullivan.	Idaho	300,000	3,000,000	10	07	Feb 1890	300	S.
17 Cariboo.	British Col.	50,000	800,000	1	02	Aug 1898	40	G.
18 Calumet & Bechtel.	Michigan	10,000	2,500,000	25	10 00	Mar 1890	250	G.
19 Centennial Eureka.	Utah	30,000	1,500,000	50	50	Feb 1890	200	S.
20 Central Lead.	Missouri	10,000	1,000,000	100	50	Feb 1890	500	G.
21 Champion.	California	34,000	840,000	10	25	April 1898	840	G.
22 Charleston.	S. Carolina	10,000	1,000,000	100	1 50	Dec 1898	100	G.
23 Colorado Smelting	Montana	100,000	1,000,000	10	1 00	Jan 1890	100	G.
24 Consolidated Tiger and Poorman.	Idaho	1,000,000	1,000,000	1	02	Dec 1898	100	G.
25 Creston Leasing.	Colorado	1,000,000	1,000,000	1	01	Dec 1898	54 1/2	G.
26 Crown King.	Arizona	600,000	6,000,000	10	02	Dec 1898	232	G.
27 Deadwood Terra.	S. Dakota	200,000	5,000,000	25	50	May 1898	1,350	G.
28 De Lamar.	Idaho	400,000	2,000,000	5	20	May 1898	2,450	S.
29 Doe Run.	Missouri	5,000	500,000	100	50	Feb 1890	250	G.
30 Elkton Consolidated.	Colorado	1,250,000	1,250,000	1	01 1/2	Nov 1898	650	S.
31 Empire State.	Idaho	75,000	750,000	10	10	Feb 1890	75	G.
32 Enterprise.	Colorado	500,000	500,000	1	05	Sept 1898	900	S.
33 Geyser Marion.	Utah	800,000	1,500,000	5	02	Sept 1898	800	G.
34 Gold Coin of Victor.	Colorado	1,000,000	1,000,000	1	01	Mar 1890	100	G.
35 Gold King.	Colorado	1,000,000	1,000,000	1	01	Feb 1890	100	G.
36 Golden Cycle.	Colorado	200,000	1,000,000	5	02 1/2	Mar 1890	100	S.
37 Golden Reward.	S. Dakota	1,000,000	1,000,000	15	Feb 1890	150	G.	
38 Grand Central.	Utah	250,000	250,000	1	12 1/2	Feb 1890	250	S.
39 Halle Mines Ltd.	British Col.	250,000	1,250,000	5	25	May 1898	125	G.
40 Highland.	S. Dakota	100,000	10,000,000	100	20	Mar 1890	3,800	G.
41 Holy Terror.	S. Dakota	300,000	300,000	1	03	Sept 1898	300	G.
42 Homestake.	S. Dakota	125,000	12,500,000	100	50	Feb 1890	750	G.
43 Hope.	Montana	100,000	1,000,000	10	10	Mar 1890	100	S.
44 Horn Silver.	Utah	400,000	10,000,000	25	05	Oct 1898	5,210	S.
45 Idaho.	British Col.	500,000	500,000	1	05 1/2	Jan 1890	250	G.
46 Iowa.	Colorado	1,000,000	1,000,000	1	00 1/2	June 1898	100	G.
47 Iron Mountain.	Montana	600,000	5,000,000	10	02	Apr 1890	507 1/2	S.
48 Isabella.	Colorado	2,250,000	2,250,000	1	06	Feb 1890	100	G.
49 Jersey Leasing.	Colorado	200,000	200,000	1	03 1/2	Oct 1898	300	S.
50 Le Roi.	British Col.	500,000	2,500,000	5	10	Apr 1898	750	G.
51 Lulu.	Colorado	1,000,000	1,000,000	1	05	Feb 1890	100	G.
52 Minnesota.	Minnesota	165,000	16,500,000	100	1 50	Oct 1898	1,750	G.
53 Modo.	Colorado	500,000	500,000	1	01	Dec 1898	110	G.
54 Montana Ltd.	Montana	600,000	3,300,000	5	05	Feb 1890	997 1/2	G.
55 Montana Ore Purchasing.	Montana	40,000	1,000,000	25	1 00	Jan 1890	800	G.
56 Morning Star.	California	2,400	240,000	100	4 00	Feb 1890	707	G.
57 Mt. Rosa.	Colorado	1,000,000	1,000,000	1	02	Jan 1890	60	G.
58 Mercury.	Utah	200,000	5,000,000	25	12 1/2	Jan 1890	1,200,000	G.
59 Mammoth.	Utah	400,000	10,000,000	25	05	Dec 1898	1,350,000	S., C., L.
60 Marca.	Colorado	1,000,000	1,000,000	1	02 1/2	Dec 1898	250	G.
61 Mead.	California	2,000,000	2,000,000	1	10	Dec 1898	800	G.
62 Montreal.	Colorado	1,000,000	1,000,000	1	01	Nov 1898	700	G.
63 Monument.	Colorado	300,000	300,000	1	01	Dec 1898	125	G.
64 Moulton.	Montana	400,000	2,000,000	5	05	Feb 1890	180,000	G.
65 Moon Anchor Gold.	Colorado	600,000	600,000	1	07 1/2	Nov 1898	234	G.
66 Mountain Copper.	California	250,000	6,250,000	25	62 1/2	Sept 1898	50	G.
67 New York & Hon. Rosario.	Central A.	160,000	1,500,000	10	10	Feb 1890	160,000	S., G.
68 Napa.	California	100,000	700,000	7	20	Jan 1890	700	Q.
69 New Idria Quicksilver.	California	100,000	500,000	5	20	Jan 1890	100,000	Q.
70 North Star.	California	200,000	2,000,000	10	25	Nov 1898	500	G.
71 Ophir Hill.	Utah	1,000	25,000	25	20 00	Dec 1898	20	G.
72 Osceola.	Michigan	50,000	1,250,000	25	2 00	Dec 1898	2,552	G.
73 Parrot.	Montana	230,000	2,900,000	10	30	Feb 1890	2,276	S.
74 Pennsylvania Consolidated.	California	51,500	5,150,000	10	05	Feb 1890	515	G.
75 Pioneer.	California	100,000	1,000,000	10	12 1/2	Dec 1898	100	G.
76 Portland.	Colorado	3,000,000	3,000,000	1	02	Feb 1890	2,250	G., S.
77 Plumbago.	California	300,000	300,000	1	15	Jan 1890	300	G.
78 Quincy.	Michigan	100,000	2,500,000	25	3 50	Feb 1890	10,150	G.
79 Raven.	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G.
80 Republic.	Washington	1,000,000	1,000,000	1	03	Jan 1890	10,000	G.
81 Sacramento.	Utah	1,000,000	5,000,000	5	00 1/2	Jan 1890	500	G.
82 Small Hopes Consolidated.	Colorado	250,000	5,000,000	20	10	Feb 1890	3,100	S.
83 South Swansea.	Utah	150,000	150,000	1	05	Oct 1898	12,000	S., L.
84 Standard.	California	200,000	20,000,000	100	10	Aug 1898	5,674	G., S.
85 St. Joseph.	Missouri	30,000	3,000,000	10	1 50	Dec 1898	2,781	G.
86 Silver King.	Utah	150,000	3,000,000	.20	25	Feb 1890	1,875	G.
87 Smuggler.	Colorado	1,000,000	1,000,000	1	01	Jan 1890	1,000	S., L., Z.
88 Swanssea.	Utah	100,000	500,000	5	05	Feb 1890	110	G.
89 Tamarack.	Michigan	60,000	1,500,000	15	4 00	Dec 1898	5,400	G.
90 Tomboy.	Colorado	200,000	2,000,000	10	25	Dec 1898	6,000	G.
91 Utah.	Utah	100,000	1,000,000	10	02	Jan 1890	1,100	G.
92 Victor.	Colorado	200,000	1,000,000	5	50	Dec 1898	1,150	G.
93 Vindicator.	Colorado	1,500,000	1,500,000	1	05	Jan 1890	150	G.
94 War Eagle.	British Col.	2,000,000	1,000,000	1	01 1/2	Feb 1890	2,000	G.
95 Wolverine.	Michigan	60,000	2,600,000	25	1 00	Oct 1898	600	G.
96 White Water.	British Col.	125,000	1,625,000	5	32	April 1898	191,000	G.
97 Yellow Aster.	California	100,000	1,000,000	10	10	Dec 1898	108,750	G.

S. Silver; G. Gold; L. Lead; C. Copper; Q. Quicksilver;
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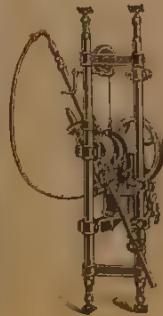
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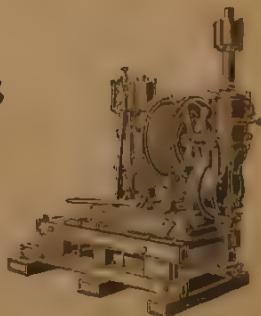
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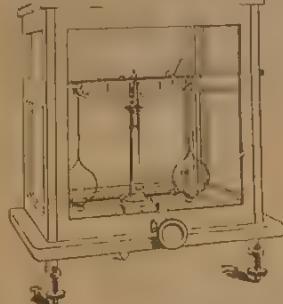
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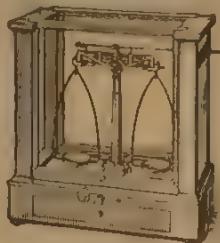
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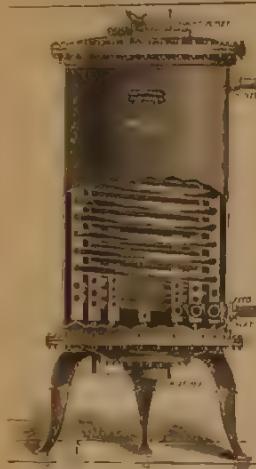
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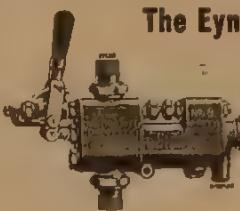
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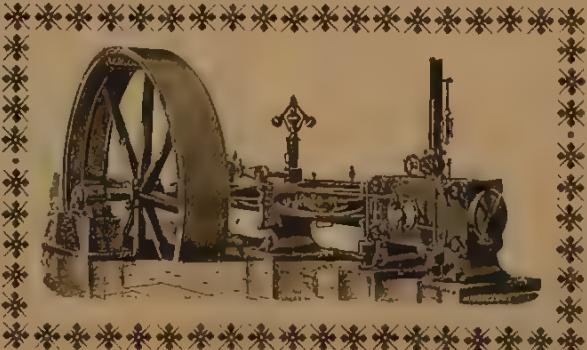
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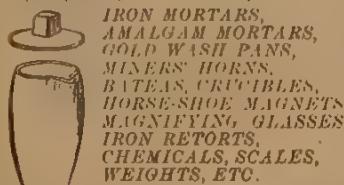
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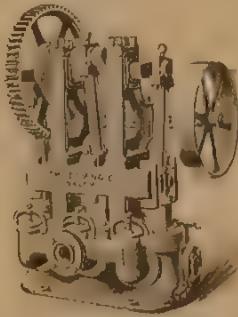
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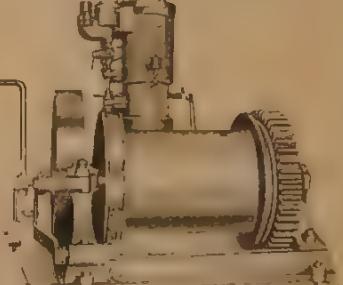
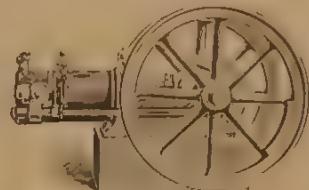
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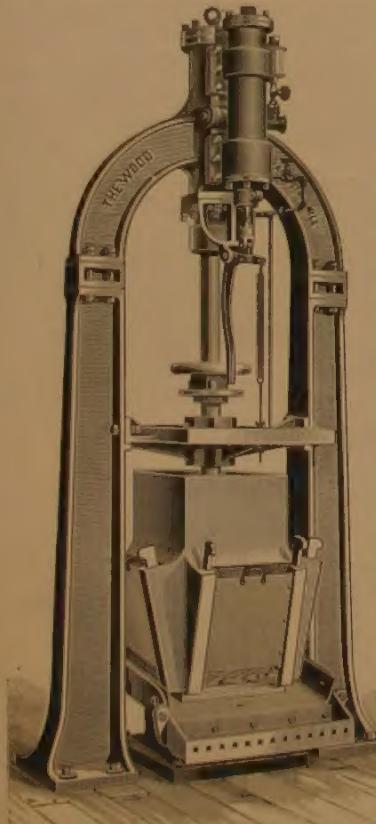
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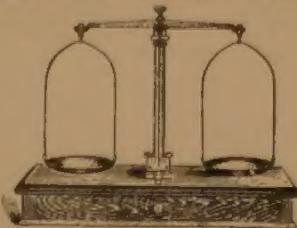
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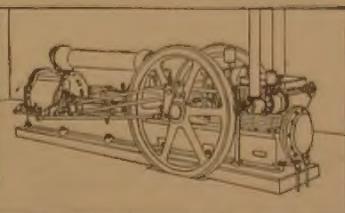


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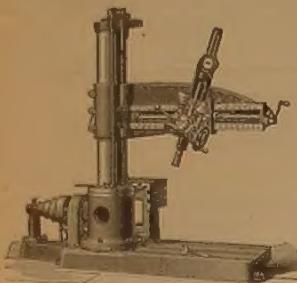
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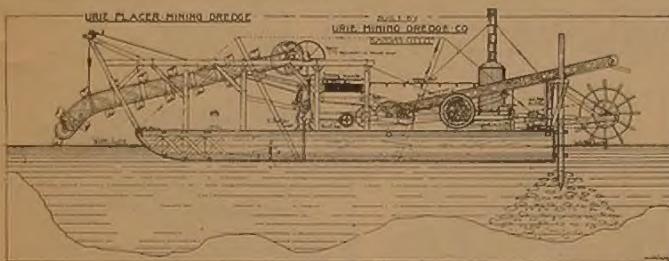
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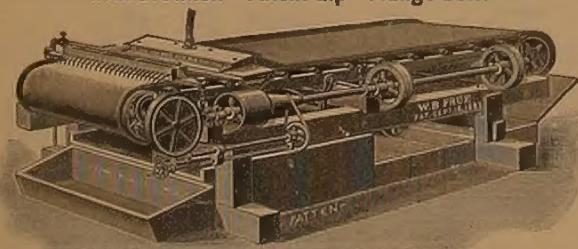
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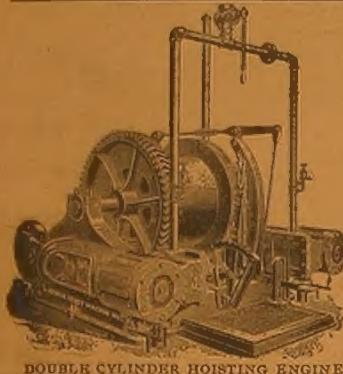
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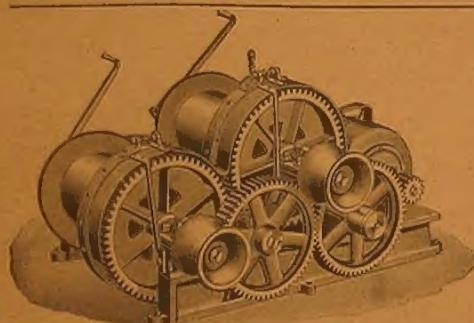
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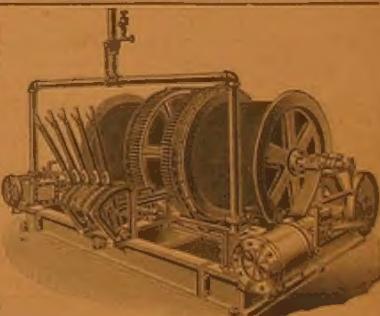
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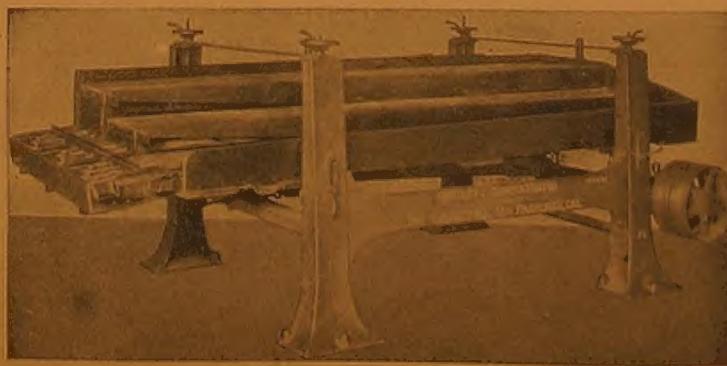
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